Order Number MOP00100020C2

Service Manual

Microwave Oven

INVERTER
SYSTEM INSIDE

NN-A890WB / NN-A860WB / NN-A860CB

EPG Continental Europe

UPG France

SPECIFICATIONS

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Inverter Warning

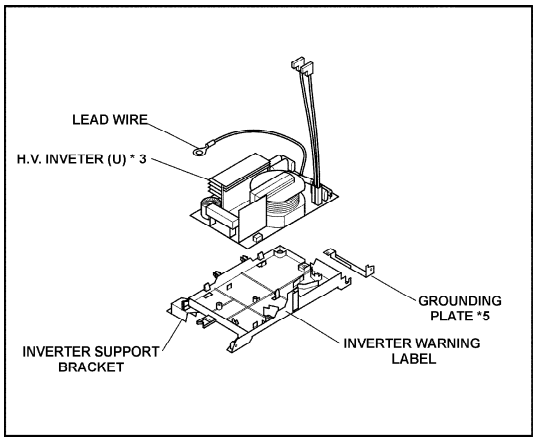
The inverter board looks like a regular PCB, however, this PCB drives the magnetron tube using very high voltages and current.
It has

1. **Very high voltage and high current**
2. **An Aluminium heat sink that becomes very hot**
3. **The capacitors on the inverter circuit will contain a high voltage charge even when the oven is not operating.**

Do not

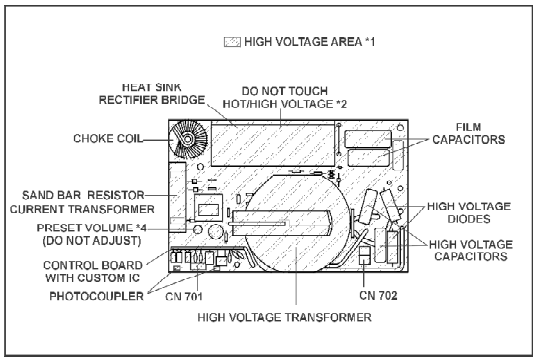
1. **Do not touch the circuitry as it contains very high voltages. When replacing the board please take extreme care to avoid possible electric shock. High voltages may remain in the circuit.**
2. **Do not touch the aluminium heat sink as it will become very hot. It also contains high voltages.**
3. **Do not attempt to repair the inverter PCB as this can be very dangerous. Replace the high voltage inverter circuit as a complete unit. Return the old unit fully repacked in the original shipping box and completed paper work.**
4. **Do not adjust or tamper with the preset volume on the inverter board. It is very dangerous to adjust this preset without proper test equipment.**
5. **Do not test the oven while the inverter grounding strip or screws are loose. It is very dangerous to operate the inverter circuit board without a proper ground connection.**

Figure 1



Inverter Gounding

Figure 2



Inverter PCB layout

2. Feature Chart

Function	NN-A890WB EPG	NN-A890WB UPG	NN-A860WB NN-A860CB EPG	NN-A860WB NN-A860CB UPG
Microwave	6	6	6	6
Grill	3	3	3	3
Convection	17	17	17	17
Combination	YES	YES	YES	YES
Sensor reheat	2	2	-	-
Sensor cook	2	2	-	-
Sensor combination	2	2	-	-
Weight defrost	2	2	2	2
Weight combination	14	14	10	10
Weight cook	-	-	2	2
Stage cooking	3	3	3	3
Delay/Stand	YES	YES	YES	YES
More/Less	YES	YES	NO	NO
Clock	24H	24H	24H	24H

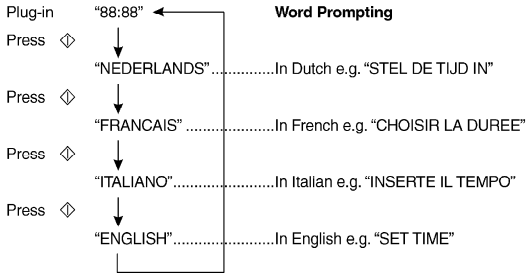
Function	NN-A890WB EPG	NN-A890WB UPG	NN-A860WB NN-A860CB EPG	NN-A860WB NN-A860CB UPG
Word prompt	1*	French	1*	French
Step by Step	LED	LED	LED	LED

***1 None, Dutch, French, Italian, English**

3. Control Panel

4. Operation And Digital Programmer Circuit Test Procedure

4.1. Word Prompting



4.2. Setting the Clock

	OPERATION	SCROLL DISPLAY
1.	Plug the power supply cord into the wall outlet	*WELCOME TO PANASONIC REFER TO OPERATING INSTRUCTIONS BEFORE USE*
2.	Press the clock pad	*SET TIME*
3.	Enter the time of day	*1✧25* *_ _ PRESS CLOCK*
4.	Press the clock pad	*1 : 25*

4.3. Microwave Cooking

	OPERATION	SCROLL DISPLAY
1.	Place a water load in the oven	■■■■
2.	Press Micro power once to set high power	*HIGH* ≋ *_ _ SET TIME*
3.	Set time at 10 sec. by pressing 10 sec. once	*HIGH* ≋ *10* *sec* ≋ *_ _ PRESS START*
4.	Press Micro power pad 3 times to set medium power	*MEDIUM* ≋ *_ _ SET TIME*
5.	Set pad for 1 minute by pressing 1 min. pad once	*1 00* *min sec* ≋ *_ _ PRESS START* *MEDIUM*
6.	Press the start pad	⏱ *10* ≋ *sec*
7.	When the first stage cooking has elapsed oven automatically switches to second stage	⏱ *1 00* ≋ *min sec*
8.	When second stage cooking has elapsed oven bleeps 5 times and shuts off	*OPEN DOOR*

4.4. Auto Weight Defrost

	OPERATION	SCROLL DISPLAY
1.	Select the desired program	*1 SMALL PIECES* *_ _ SET WEIGHT* ≋ ❚❚
2.	Enter the weight by pressing the g pad	300 G ≋ ❚❚
3.	Select the desired program	⏱ ***5 21*** ≋ *min* ❚❚ *sec*

4.5. Delay Stand

	OPERATION	SCROLL DISPLAY
1.	Set power level and time	■■■■
2.	Press Stand	*STAND* *SET TIME*
3.	Set standing time	*H1 00* *PRESS START*
4.	Press Start	⏱ *10 00* *min sec* ≋ *10 00* *min sec*

4.6. Delay Start

	OPERATION	SCROLL DISPLAY
1.	Press Delay	*DELAY START* *SET TIME*
2.	Set delay time	*1H 00* *CHOOSE COOKING MODE* *OR PRESS START* *DELAY START*
3.	Set power level and time	■
4.	Press start pad	*1H 00*

4.7. Child Lock

	OPERATION	SCROLL DISPLAY
1.	To set press start pad three times	*LOCK*
2.	To cancel press three times	*1 : 25*

4.8. Grill Operation

	OPERATION	SCROLL DISPLAY
1.	Select grill power press once for grill 1	*GRILL 1* *PRESS START TO PREHEAT* *OR SET TIME*
2.	Set cooking time	*1 00* *min sec* *PRESS START* *GRILL 1*
3.	Press start	*1 00* *min sec*

4.9. Convection Operation

	OPERATION	SCROLL DISPLAY
1.	Press convection pad to select oven temperature	*150°C* *PRESS START TO PREHEAT* *OR SET TIME*
2.	Press start to preheat	*P*
3.	Press time pades to enter cooking time	*1H 00* *PRESS START* *150°C*
4.	Press start pad	*1H 00*

4.10. Turbo Bake Operation

	OPERATION	*SCROLL DISPLAY*
1.	Press turbo bake pad to select oven temperature	*150 C* *GRILL 1* *PRESS START TO PREHEAT OR SET TIME*
2.	Press grill pad to select power	*GRILL 3* *PRESS START TO PREHEAT OR SET TIME* *150 C*
3.	Press start to preheat	*P*
4.	Pres time pads to enter cooking time	*H 10* *PRESS START* *150 C* *GRILL 3*
5.	Press start	*10 00* *min sec*

4.11. Combination Cooking (Convection and Microwave)

	OPERATION	SCROLL DISPLAY
1.	Press combination pad	*COMBINATION CHOOSE FIRST COOKING MODE*
2.	Press convection pad to select oven temperature	*150 C* *SELECT MICROPOWER COMBINATION*
3.	Select micro power	*MEDIUM* *SET TIME COMBINATION* *150 C*
4.	Press start if preheating	*P 59* *sec*
5.	Set cooking time	*H 10* *PRESS START COMBINATION* *150 C* *MEDIUM*
6.	Press start pad	*10 00* *min sec*

4.12. Combination Cooking CGrill and Microwave)

	OPERATION	SCROLL DISPLAY
1.	Press combination pad	*COMBINATION CHOOSE FIRST COOKING MODE*
2.	Press grill pad to select oven temperature	*GRILL 1* *SELECT MICROPOWER COMBINATION*
3.	Select micro power	*MEDIUM* *PRESS START TO REHEAT OR SET TIME COMBINATION GRILL 1*
4.	Press start if preheating	*P*
5.	Set cooking time	*H 10* *PRESS START COMBINATION GRILL 1 MEDIUM*
6.	Press start pad	*10 00* *min sec*

4.13. Combination Cooking (Turbo Bake and Microwave)

	OPERATION	SCROLL DISPLAY
1.	Press combination pad	*COMBINATION CHOOSE FIRST COOKING MODE*
2.	Press Turbo Bake pad to select oven temperature	*150 C* *GRILL 1 SELECT MICROPOWER COMBINATION*
3.	Select micro power	*MEDIUM* *SET TIME COMBINATION 150 C GRILL 1*
4.	Press start if preheating	*P*
5.	Set cooking time	*H 10* *PRESS START COMBINATION 150 C GRILL 1 MEDIUM*
6.	Press start pad	*10 00* *min sec*

4.14. Auto Weight Cook Programs (NN-A860WB, NN-A860CB)

	OPERATION	SCROLL DISPLAY
1.	Select the desired auto weight cook program	*FRESH VEGETABLES* *SET WEIGHT*
2.	Enter the weight by pressing the g pad	600 G *PRESS START*
3.	Press start	*12 36* *min sec*

4.15. Auto Weight Cook Program NN-A890WB)

	OPERATION	SCROLL DISPLAY
1.	Select the desired auto weight cook program	*7 FROZEN PIZZA* ≋ *SET WEIGHT*
2.	Enter the weight by pressing the g pad	*400 G* ≋ *PRESS START*
3.	Press start	⏱ ***9 00*** ≋ *min sec*

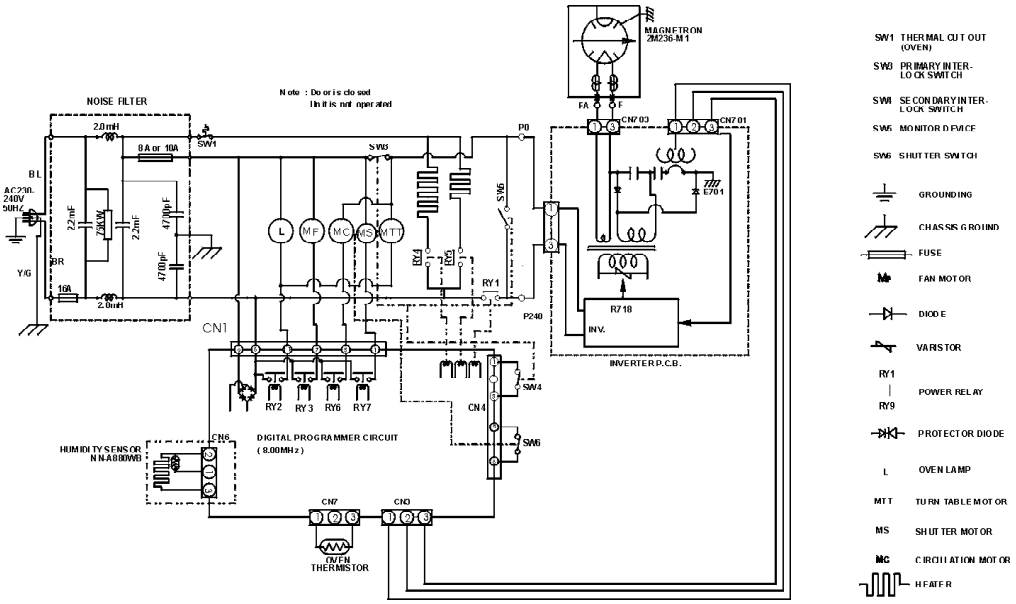
4.16. Auto Sensor and Sensor Combi Programs (NN-A890WB)

	OPERATION	SCROLL DISPLAY
1.	Select the desired sensor program	4. FRESH FISH ≋ *PRESS START*
2.	Press start	4. FRESH FISH

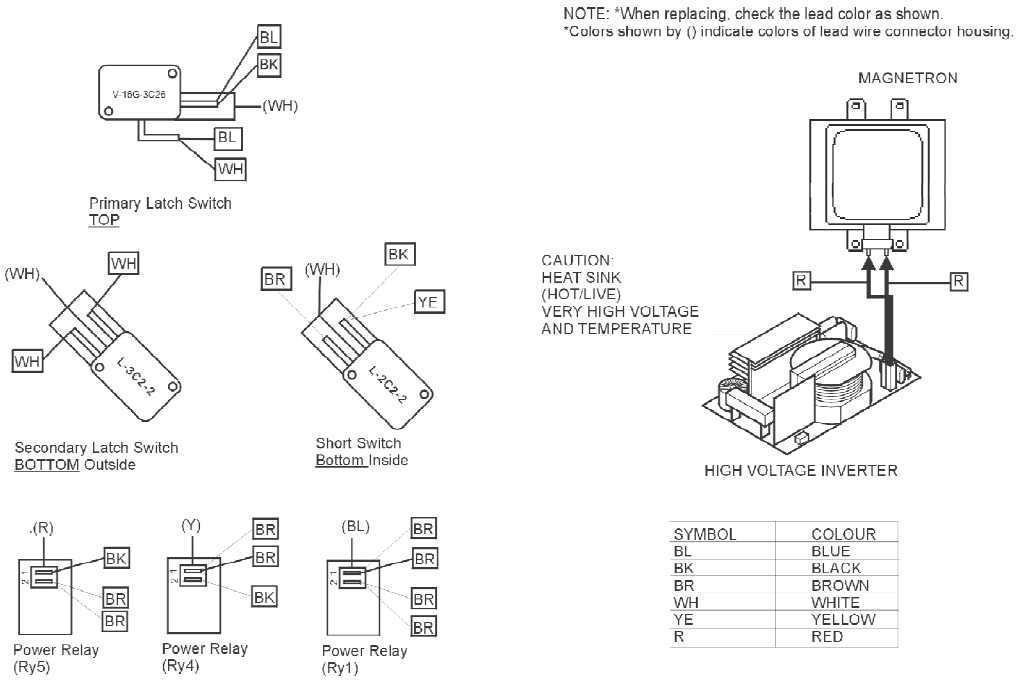
Note: If you select an auto sensor program directly after plugging the oven in an initial warm up period will automatically count down in the display window, after which the sensor program can be operated

Note: The sensor programs cannot be used when the oven is hot. If a second sensor program is selected "HOT" will appear in the display.

5. Schematic Diagram



6. Wiring Diagram



SYMBOL	COLOUR
BL	BLUE
BK	BLACK
BR	BROWN
WH	WHITE
YE	YELLOW
R	RED

7. Description of Operating instruction

7.1. Variable power cooking control

The HIGH VOLTAGE INVERTER POWER SUPPLY controls the output power by a signal from the digital Programmer circuit DPC. The power relay (RY1) turns on to supply power to the inverter circuit. The level of output power is controlled by the drive signal level from the inverter circuit. NOTE1: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating the magnetron filament. / NOTE: 2 If microwave cooking is over 8 minutes on HIGH power, the fan motor rotates for 1 minute after cooking to cool the oven and electrical components.

Duty cycles for microwave cooking

	Output	Duty ON/OFF	
		ON time	OFF time
High	1000W	22”	0”
Defrost	440W	16”	6”
Medium	600W	22”	0”
Low	440W	22”	0”
Simmer	440W	15”	7”
Warm	440W	8”	14”

7.2. Grill Cooking

The digital programmer circuit controls the grill power by operating the power relay RY4 in the sequence shown in the table below

Duty cycles for Grill Cooking

	Duty ON/OFF	
	ON Time	OFF Time
Grill 1	66”	0”
Grill 2	54”	12”
Grill 3	42”	24”

7.3. Auto weight defrost, Auto weight Cook

When an auto control feature is selected and the start pad pressed:

1. **The digital programmer circuit determines the power level and the cooking time and indicates the operating state in the display. The table shows the corresponding cooking times for each category and its respective weight.**
2. **When the cooking time in the display window has elapsed, the oven turns off automatically via the control signal from the digital programmer circuit.**
   Note: After auto cooking if the oven temperature is over the predetermined temperature the fan motor rotates to cool the oven and its components.

Auto Weight Defrost NN-A890WB NN-A860WB NN-A860CB

Category	1st Touch Weight	Cooking Time
Small Pieces	300	5m 21s
Big Pieces	600	11m 30s

Auto Weight Defrost NN-A890WB only

Category	1st Touch Weight	Cooking Time
Frozen Bread	100	4m 18s

Auto weight Cook NN-A880WB

Category	1st Touch Weight	Cooking Time
7.Reheat Frozen Pizza	400	9m
8.Reheat Fresh Pizza	400	8m 40s
9.Reheat Frozen Quiche	400	12m40s
10.Reheat Fresh Quiche	400	12m 40s
11.Cook Chicken Pieces	500	14m 40s
12.Cook Whole Chicken	1300	23m 54s
13.Cook Pork or Veal	1200	35m
14.Cook Beef	900	25m 59s
15.Cook Lamb	1200	28m 26s
16.Tart	4 - 5	25m
17.Tart	6 - 8	29m
18.Tart	8 - 10	30m
19.Tart	10 - 12	34m

Auto weight Cook NN-A860WB NN-A860CB

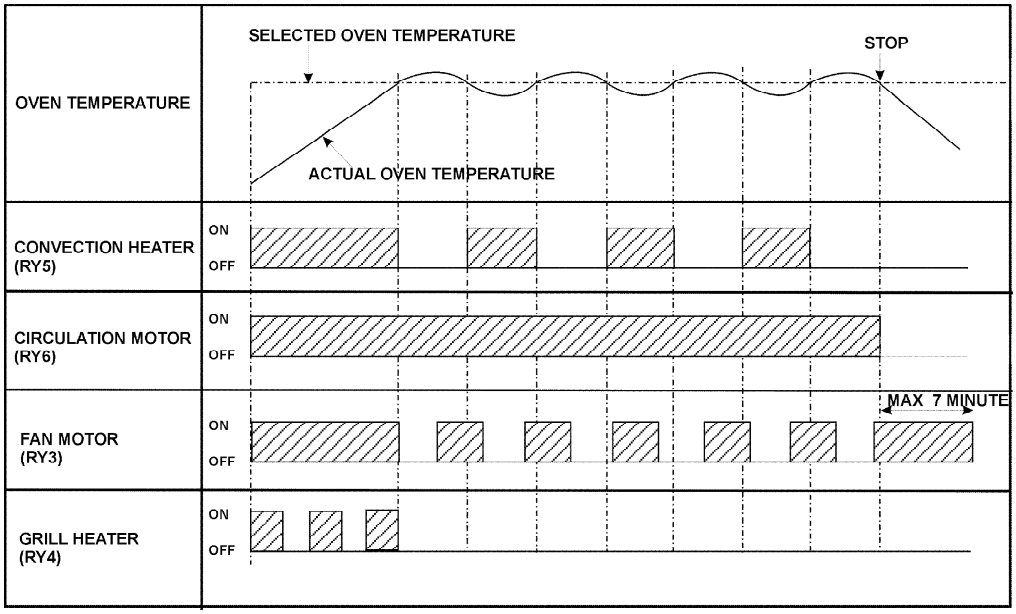
Category	1st Touch Weight	Cooking Time
1.Fresh Vegatables	600	12m 36s
2.Fresh Fish	400	5m
3.Frozen Bread	100	4m 18s
4.Frozen Pizza	400	9m
5.Frozen Quiche	400	12m 40s
6.Frozen Gratin	400	12m 20s
7.Frozen Fries	300	11m 50s
8.Chicken Pieces	500	14m 40s
9.Whole Chicken	1300	23m 54s
10.Veal or Pork	1200	35m
11.Beef	900	25m 59s
12.Lamb	1200	28m 26s

7.4. Convection Cooking

1. **The digital programmer circuit operates the power relays RY3,RY5 and RY6 in the sequence as shown in the figure below.**
2. **When the oven reaches a predetermined temperature the digital programmer circuit stops supplying power to relay RY5, resulting in the convection heater turning off.**

3. **When the temperature drops below the predetermined temperature, the digital programmer circuit supplies power to power relay RY5 resulting in the convection heater turning on. Note: After the convection process, if the oven temperature is higher than the predetermined temperature, the fan motor rotates to cool the electronic components and the oven.**

Figure 1



Convection Cooking Duty Cycles

7.5. Combination Cooking

Combination cooking is achieved by operating the microwave and heater modes together during one cooking cycle. There are three combination modes.

1. Combination (convection and microwave)

2. Combination (grill and microwave)

3. Combination (grill, convection and microwave)

The digital programmer circuit operators the power relays as shown in the figures below.
When the oven temperature reaches the predetermined temperature, the digital programmer circuit stops supplying power to relay (RY5) resulting in the convection heater turning off. During this time the digital programmer circuit continues to operate relay (RY1) so that microwave activity continues at the duty cycle selected. The inverter control signal level is also maintained. The microwave activity continues to cycle until the entire cooking program is completed.
When the oven temperature drops below the selected temperature, the digital programmer circuit operates power relay (RY5) switching on the heater elements.
In the case of grill combination the sequence applies with the digital programmer circuit switching power relay (RY4) to control, the grill elements.
With convection, grill and micro power combination. The grill elements and convection

elements are operated alternatively whilst the oven temperature is above the selected level.

Convection And Microwave Combination Duty Cycles

Convection Heater	Micropower			
100 - 250 C		OUTPUT	ON	OFF
	Medium	600W	66	0
	Low	440W	66	0
	Simmer	440W	45	21
	Warm	440W	24	42

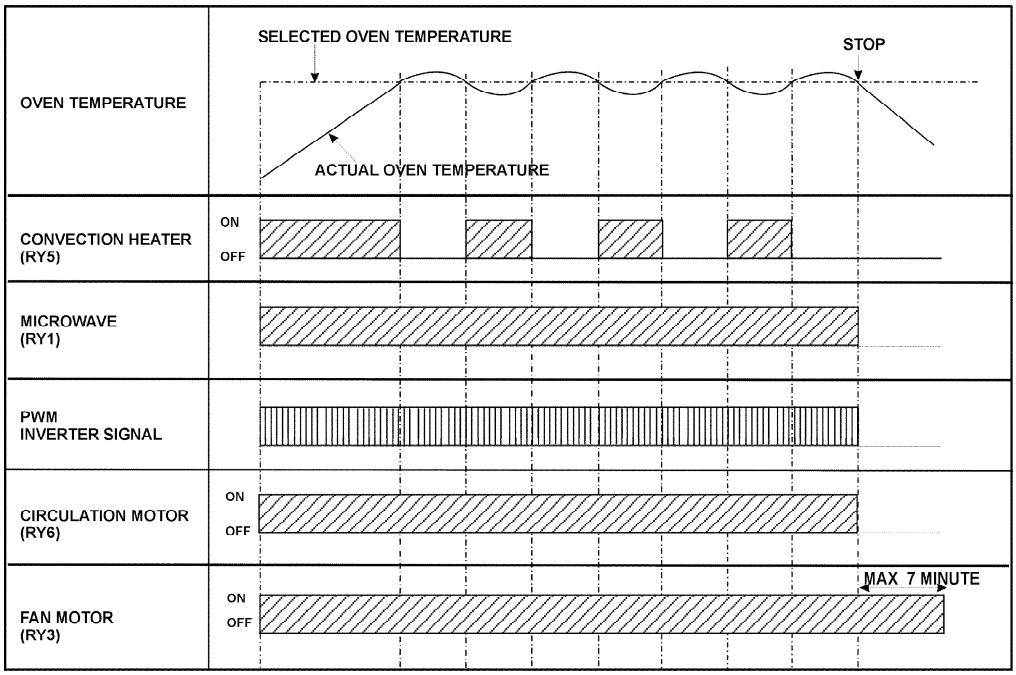
Grill And Microwave Combination Duty Cycles

Grill Heater			Micropower			
	ON	OFF		OUTPUT	ON	OFF
Grill 1	54	12	Medium	600W	66	0
Grill 2	42	24	Low	440W	66	0
Grill 3	34	32	Simmer	440W	45	21
			Warm	440W	24	42

Grill Convection And Microwave Combination Duty Cycles

Convection Heater	Grill Heater			Micropower			
100 - 250 C		ON	OFF		OUTPUT	ON	OFF
	Grill 1	54	12	Medium	600W	66	0
	Grill 2	42	24	Low	440W	66	0
	Grill 3	34	32	Simmer	440W	45	21
				Warm	440W	24	42

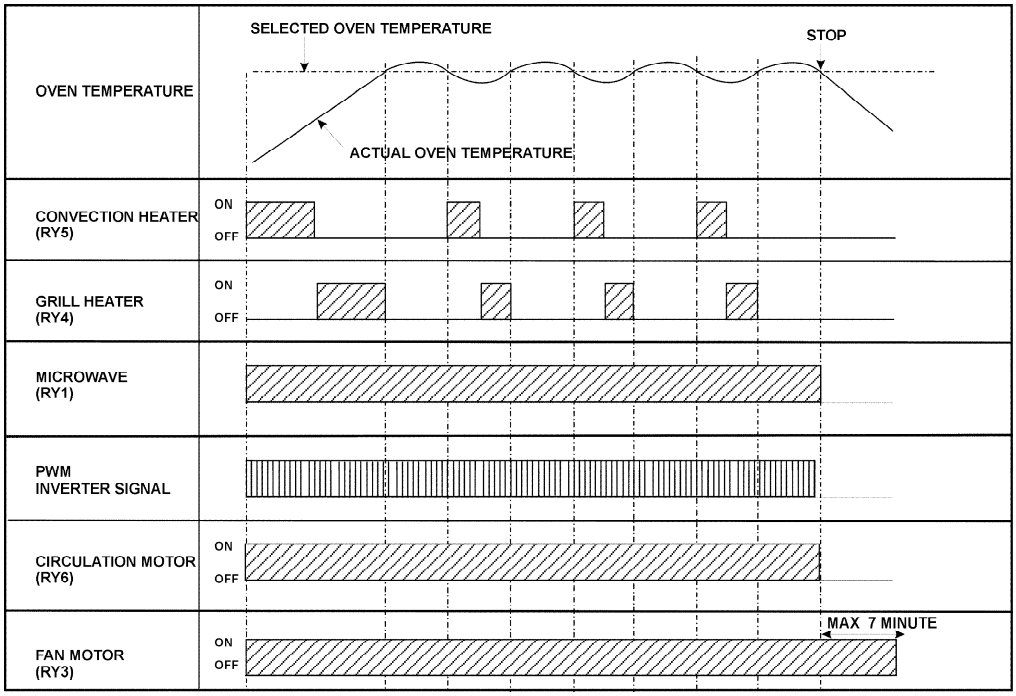
Figure 1



Convection and microwave duty cycles

Figure 2

Grill and microwave duty cycles



Grill,Convection and microwave duty cycles

7.6. One touch Auto sensor cooking NN-A890WB

Auto sensor cook is a revolutionary way to cook by microwave without setting a power level or selecting a time. All that is necessary is to select an auto sensor program before starting to cook. /

Understanding Auto sensor cooking / / As food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In auto

sensor cooking, a carefully designed instrument, called the humidity sensor element, senses the escape of steam. then, based upon the auto sensor program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE: Auto sensor cooking is successful with the foods and recipes found in the auto sensor cooking guide. Because of the vast differences in food composition, items not mentioned in the cooking guide should be prepared in the microwave oven using the power select and time features. Please consult variable power microwave cook book for procedures.

/ Explanation of the auto sensor cooking process /

1. **The shaded columns in figure 1 indicate when the humidity sensor heater is on.**
2. **During the 30 second period there is no microwave activity. When calculating the T2 time by using the formula below, make sure this 30 seconds is subtracted from the T0 time.**
3. **T1 time T0 time - 30 seconds**
4. **T2 time when the steam escapes from the cooking container placed in the oven, the humidity sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.**

Balance of cooking (T2 time)

The balance of cooking time which is called T2 time, can be calculated by the following formula.

/ T2 time (in sec.) = T1 time x K factor

NOTE: Remember, the T1 time starts after the start pad is tapped. The coefficient K is programmed into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powe r. /

NOTE: When “More“or “Less” pad is selected, the K factor varies resulting in T2 time to be increased or decreased.

Calculating the T2 time

Example 1: If the t1 time is measured to be 2 minutes and 40 seconds, and the auto sensor program is selected is sensor reheat. Fish (Program 4)

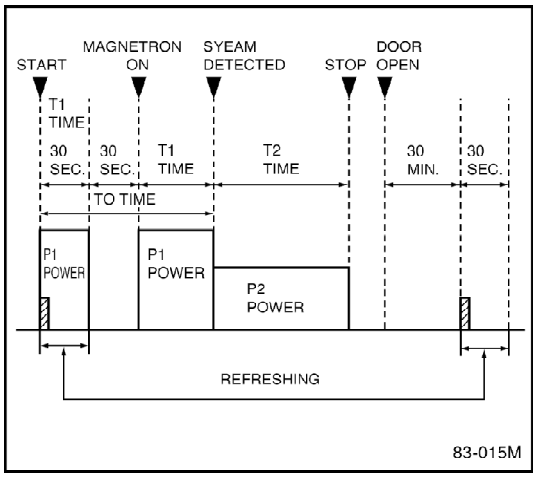
T2 = T1 x K

= 2 min. and 40 sec. X. 0.3

=48 sec.

Catergory	P1 POWER	P2 POWER	K FACTOR STANDARD
1. Chilled meal	HIGH	HIGH	1.6
2. Frozen meal	MED	HIGH	0.9

Figure 1



Auto sensor cooking

8. Cautions to Be Observed When Troubleshooting

Unlike many other appliances, the microwave oven is a high voltage, high current is device. Though it is free from danger in ordinary use, extreme care should be taken during repair.

Caution

Servicemen should remove their watches whenever working close to or replacing the magnetron.

8.1. Check the grounding

Do not operate on a two wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to ensure the appliance is properly grounded before beginning repair work.

8.2. Inverter Warnings

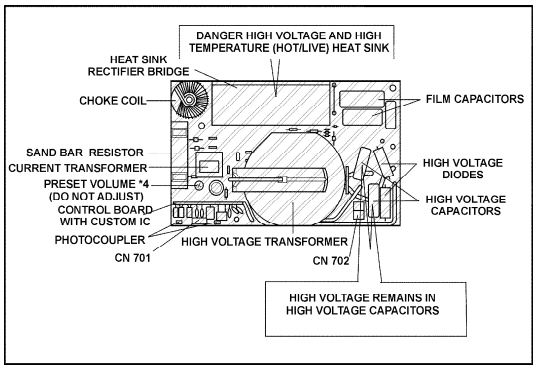
DANGER, HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LINE) OF THE INVERTER POWER SUPPLY (U)

This high voltage inverter power supply handles very high voltage and very high current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair. As you can see, it looks like a TV flyback transformer, however, the current is extremely large and is therefore, dangerous due to this high current and high voltage.

The aluminium heat sink is also energized with high voltage (HOT), so do not touch when the AC input terminal is connected. The power devices (Collector) is directly connected to the aluminium heat sink.

The aluminium heat sink may be (HOT) due to heat energy, therefore, extreme care should be taken during servicing.

Figure 1

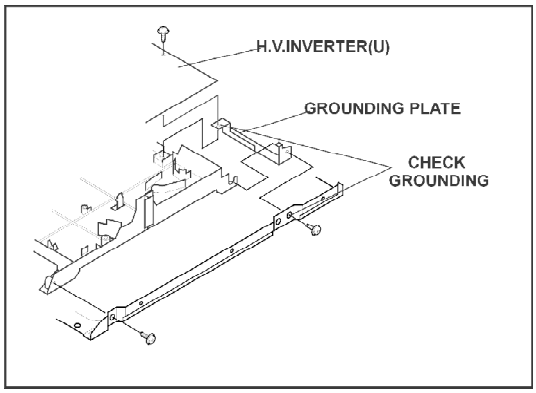


HV Inverter warning

WARNING FOR INVERTER POWER SUPPLY (U) GROUNDING

Check the high voltage inverter power supply circuit grounding. This high voltage inverter power supply circuit board must have a proper chassis ground, the inverter grounding bracket must be connected to the chassis. If the inverter board is not grounded it will expose very high voltages and cause extreme DANGER! Be sure that the inverter circuit is properly grounded via the inverter earth bracket.

Figure 2



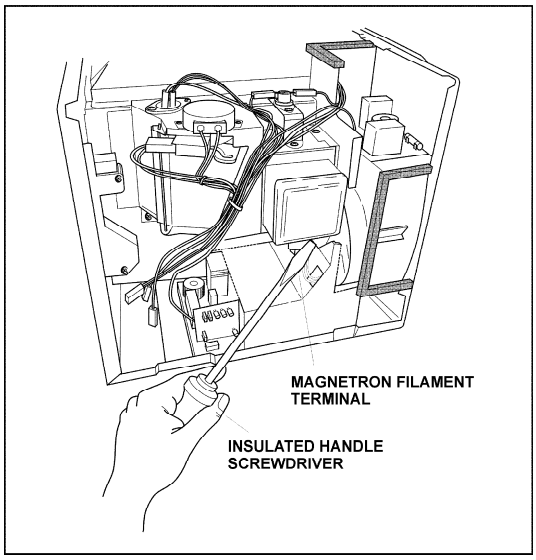
Inverter Grounding

WARNING! DISCHARGE THE HIGH VOLTAGE CAPACITORS

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the inverter power supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and short the inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please be sure to touch the chassis ground side first and then short to the output terminals.

Figure 3



Discharging the high voltage capacitors

WARNING

There is high voltage present with high current capabilities in the circuits of the primary and secondary windings, choke coil and heat sink of the inverter. It is extremely dangerous to work on or near these circuits with the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

8.3. When parts must be replaced, remove the power plug from the outlet.

8.4. When the 10A fuse is blown due to the operation of the short switch:

WARNING

When the 10A 250V fuse is blown due to the operation of the short switch, the primary latch switch and short switch must be replaced. It is also important to change the power relay 1 (RY1) when the continuity test shows shorted contacts.

1. **This mandatory. Refer to “adjustments and measurements” for the location of these switches.**
2. **When replacing the fuse, confirm that it has the appropriate rating for these models.**

3. When replacing faulty switches, be sure the mounting tabs are not bent, broken or deficient in their ability to hold the switches.

8.5. Avoid inserting nails, wire etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any holes or gaps, because such objects may work as an antenna and cause microwave leakage.

8.6. Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwaves might leak if screws are not properly tightened.
2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
3. Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage).

CAUTION MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY

IMPORTANT NOTICE

The following components have potentials above 250V while is appliance is operated.

- **Magnetron**
- **High voltage transformer (Located on inverter (U))**
- **High voltage diodes (Located on inverter (U))**
- **High voltage capacitors (Located on inverter (U))**

Pay special attention in these areas.

When the appliance is operated with the door hinges or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/ cm_3. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly fixed.

8.7. Sharp Edges

Caution

Please use caution when unpacking, installing or moving the unit, as some exposed edges may be sharp to touch and cause injury if not handled with care.

9. Parts Replacement Procedure

9.1. Magnetron

1. Discharge the high voltage capacitors on the inverter circuit.
2. Remove the five screws shown in figure 1
3. Disconnect the two high voltage leads from the magnetron
4. Remove the four screws holding the magnetron as shown in figure 2

NOTE: After replacing the magnetron, tighten the mounting screws making sure that there is no gap between the waveguide and the magnetron to prevent microwave leakage.

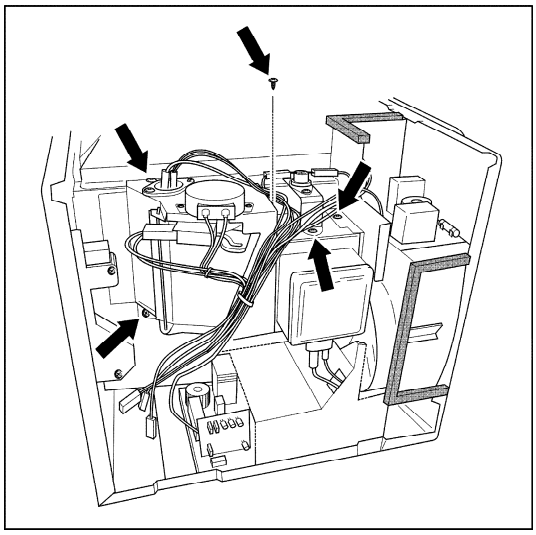
Caution

When replacing the magnetron, ensure that the antenna gasket is in place.

Note

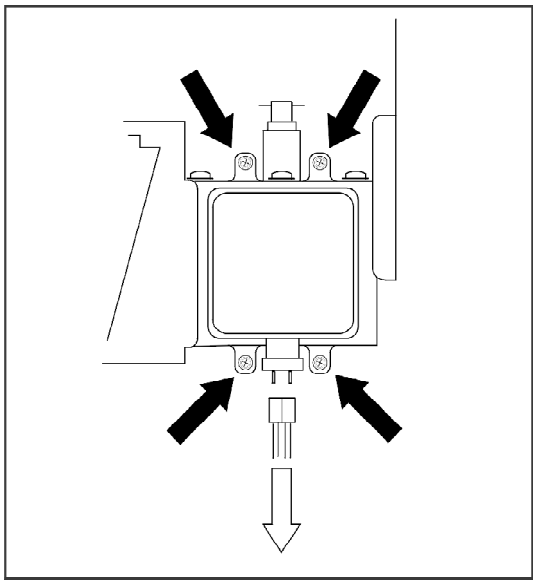
The magnetron used for this model is unique for the inverter power supply system. Make sure to use the magnetron as listed in the parts list.

Figure 1



Removal of the magnetron

Figure 2



Screws to remove the magnetron

9.2. Inverter power supply (U)

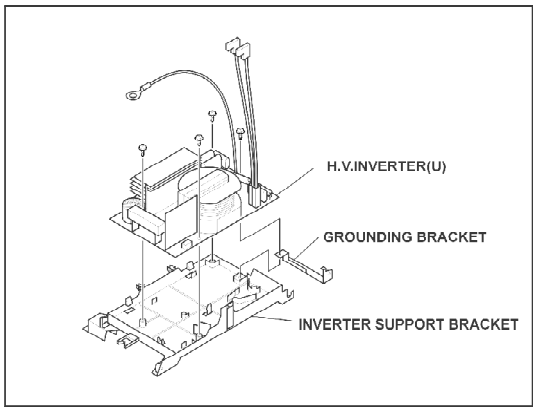
1. Discharge the high voltage capacitors
2. Unplug the H.V. Lead wires from the magnetron
3. Remove the connector CN701 and CN702 from the inverter PCB
4. Remove the two screws holding the inverter base to the chassis (See figure 3)
5. Remove the one screw holding the inverter earth wire to the oven chassis.
6. Carefully remove the inverter PCB and support base from the oven.
7. Remove the air guide E by un-clipping the catch hooks
8. Remove the four screws holding the PCB to the inverter support base.

Caution when replacing the inverter power supply (U)

1. Make sure that grounding plate is in place
2. Securely tighten the grounding screw through the side of the chassis (Base).
3. Securely connect the 3 lead wire connectors
4. Make sure that the heat sink has enough space (gap) from the oven. Take care not to touch any lead wire to the aluminium heat

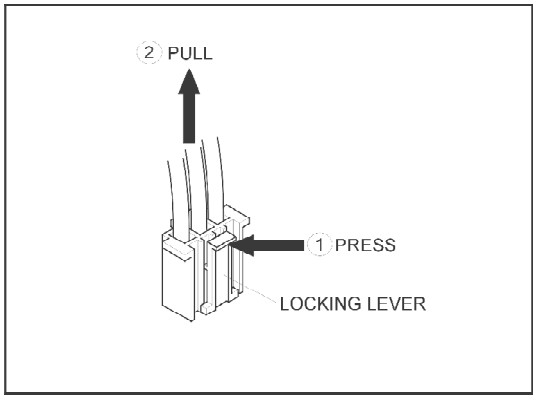
sink because it is hot.

Figure 3



Removal of the inverter PCB

Figure 4



Disconnecting the PCB lock connector

9.3. Digital Programmer Circuit (DPC) and membrane key board.

NOTE: Ground any static electric built up on your body before handling the DPC.

1. **Disconnect all connectors from the DPC.**
2. **Remove the four screws holding the escutcheon base and slide the escutcheon base upward slightly. removal is easier with the door open.**
3. **Release the flat cable.**
4. **Remove the six screws holding the DPC DU assembly**
5. **Remove the door lever**
6. **Remove the nine screws holding the DPC AU assembly**

To remove escutcheon pad

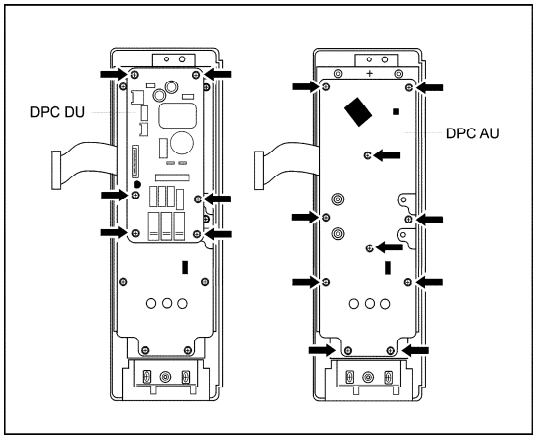
1. **Remove the escutcheon bracket from the escutcheon base by freeing the 4 catch hooks on the escutcheon base.**

2. Peel away the display window from the inside of the base.
3. Remove the membrane assembly by pushing from the inside of the base and then peeling away from the outside surface.

NOTE:

1. The escutcheon key board is attached to the escutcheon base with double faced adhesive tape. Therefore, applying hot air such as using a hair dryer is recommended for smoother removal
2. When installing a new escutcheon key board, make sure that the surface of the escutcheon base is cleared sufficiently so that problems such as, shorted contacts and uneven surfaces can be avoided.

Figure 5



Removal of DPC DU and DPC AU

9.4. Low voltage transformer and/or power relays

Note

Be sure to ground your body to discharge any static before handling the DPC.

1. Using a solder wick or a de soldering tool and a 30W soldering iron, carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.
2. With all of the terminal pins cleaned and separated from the DPC contacts, remove the defective transformer/power relays and install the new components making sure that the terminal pins are inserted completely. Carefully re solder all terminal contacts carefully.

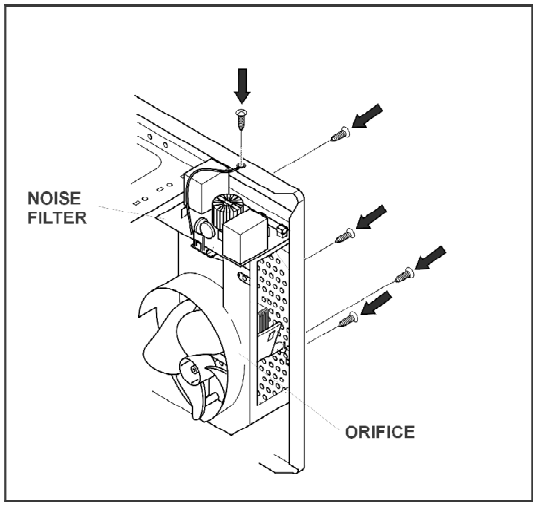
Note

Do not use a soldering iron or de soldering tool of more than 30 watts on DPC contacts

9.5. Fan Motor

1. **Disconnect the two lead wires from the fan motor terminals**
2. **Remove the power cord by removing the two wires from the noise filter and the ground connection from the oven chassis.**
3. **Remove the noise filter**
4. **Remove the two screws holding the orifice assembly**
5. **Remove the two screws holding the fan motor assembly**
6. **Detach the orifice assembly and the fan motor assembly from the oven assembly.**
7. **Remove the fan blade from the fan motor by pulling outward.**

Figure 6



Removing the fan motor

9.6. Door disassembly

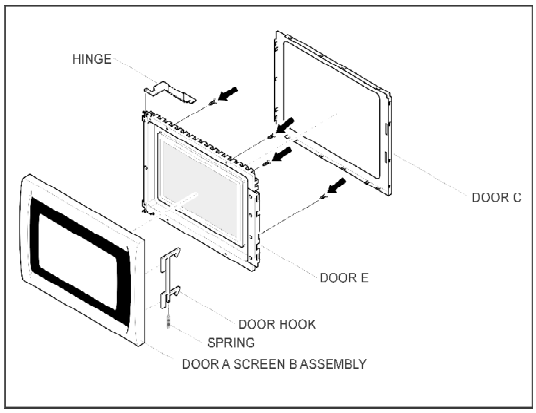
1. **Remove door C from door E by carefully pulling outward starting from the upper right hand corner using a flat blade screwdriver.**
2. **Remove four screws holding the door E to the door A assembly**
3. **Replace the door A and screen B as a complete unit.**
4. **Remove the door key and spring from the door E**

After replacement of the defective component parts of the door, reassemble it and follow the

instructions below for proper installation and adjustment so as to prevent excessive microwave leakage.

1. **When mounting the door to the oven, be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge in the direction necessary for proper alignment.**
2. **Adjust so that the door has no play between the inner door surface and the oven front surface. if the door assembly is not mounted properly, microwave power may leak from the clearance between the door and oven.**
3. **Perform the microwave leakage test.**

Figure 7



Disassembly of the door

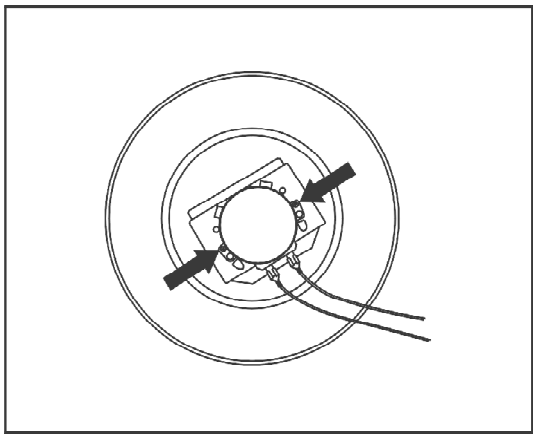
9.7. Turntable Motor

1. **Remove the motor cover by breaking off at the 8 spots indicated by the arrows.**
2. **Disconnect the two lead wires connected to the turntable motor**
3. **Remove the turntable motor by removing the two screws**

Note: After breaking off the motor cover, make sure that cut-off portions are properly trimmed off or bent inside so that no sharp edges are exposed.

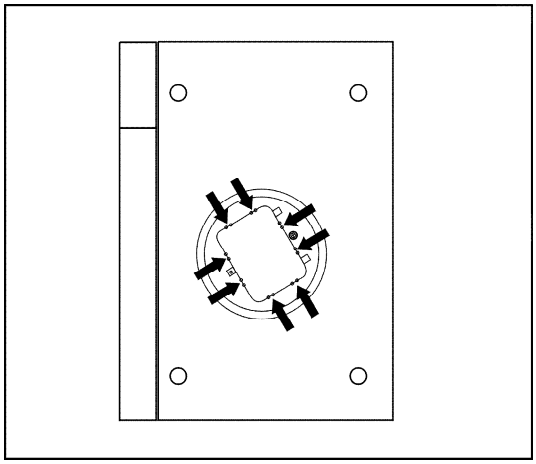
Note: To secure the motor cover use a 4 x 6 screw.

Figure 8



Removing the Turntable motor cover

Figure 9

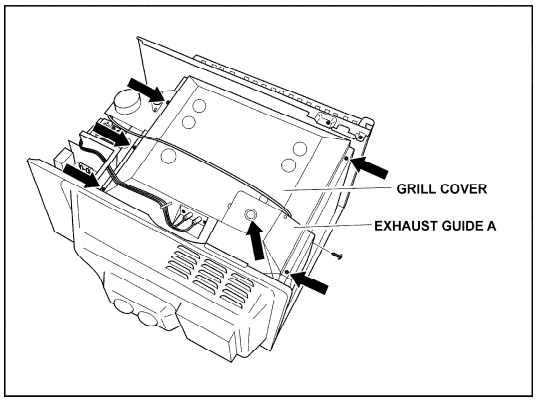


Two screws to remove the turntable motor

9.8. Quartz Heater

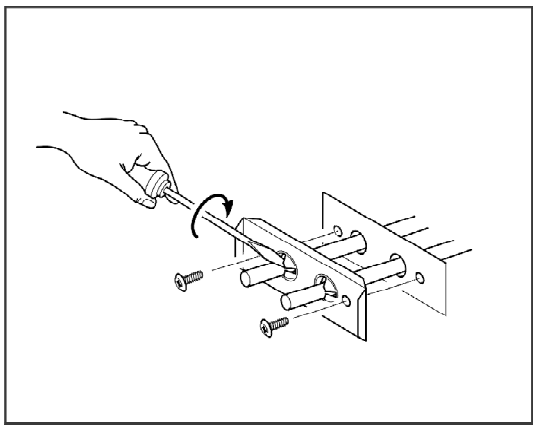
1. **Remove the sensor cable from the DPC connector CN7.**
2. **Remove the exhaust guide A by removing the two screws shown in figure 10.**
3. **Disconnect the cables to the grill heater**
4. **Remove the grill cover by removing the 5 screws in figure 11**
5. **Remove the two screws holding the grill heater (Figure12).**
6. **Loosen the 2 screws holding the ceramic grill holders, turn the holders to release the grill element.**
7. **Remove the heater bracket D by using a flat blade screw driver to lever back the tabs.**
8. **The grill element can now be removed from inside the oven.**

Figure 10



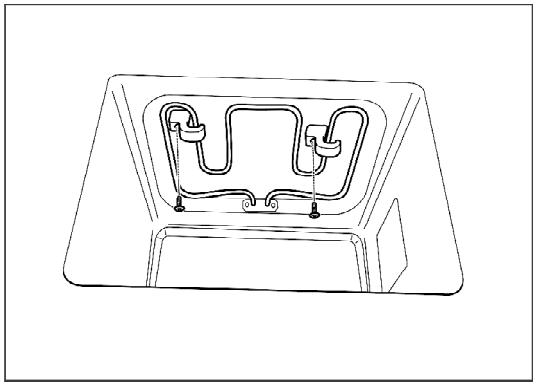
Removing the exhaust guide and grill cover

Figure 11



Removing the screws holding the grill heater

Figure 12



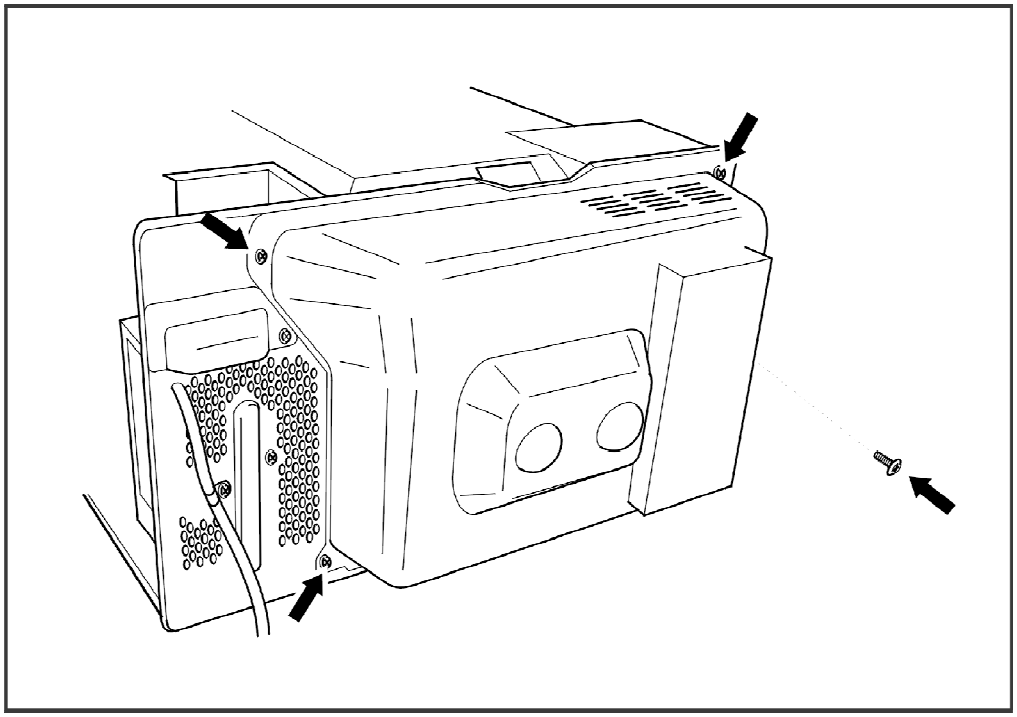
Removing the grill element

9.9. Convection Element And Circulation Fan Motor

1. **Remove one screw to remove the the exhaust guide D. Figure 13.**
2. **Remove the rear heater cover by removing the three screws. Figure 13**
3. **Remove the temperature sensor by removing the two screws. Figure 14**

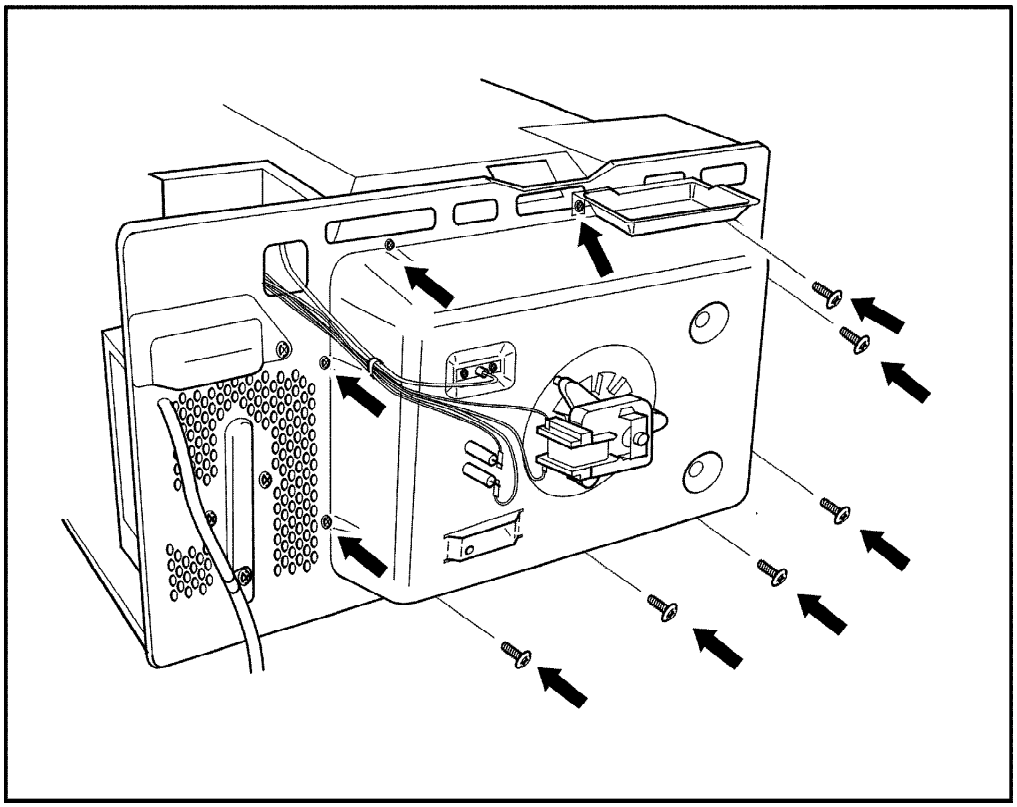
4. **Remove the power cord.**
5. **Remove the wire terminals from the circulation fan motor and the convection heater element.**
6. **Remove the four screws from the oven base. Figure 15**
7. **Carefully place hte oven onto its base and remove the backplate.**
8. **Remove the nut holding the circulation fan. Figure 16**
9. **Remove the circulation fan by removing the three screws. Figure 16**
10. **Remove the convection element by removing the two screws. Figure 16**

Figure 13



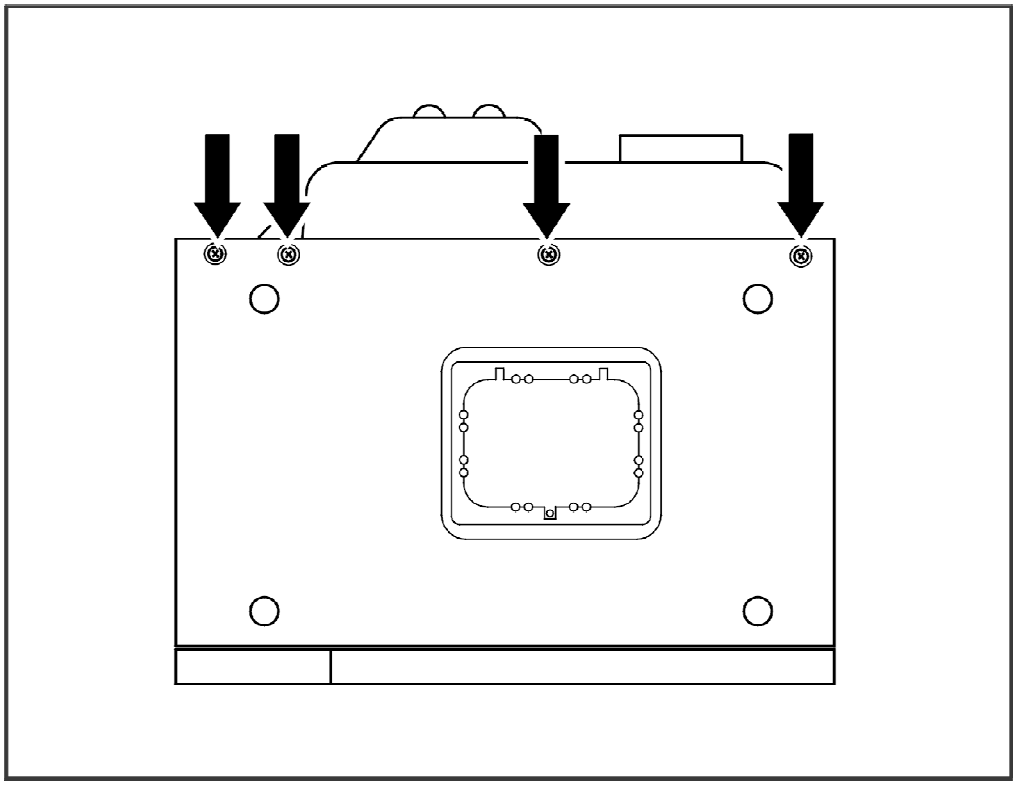
Removing the rear heater cover

Figure 14



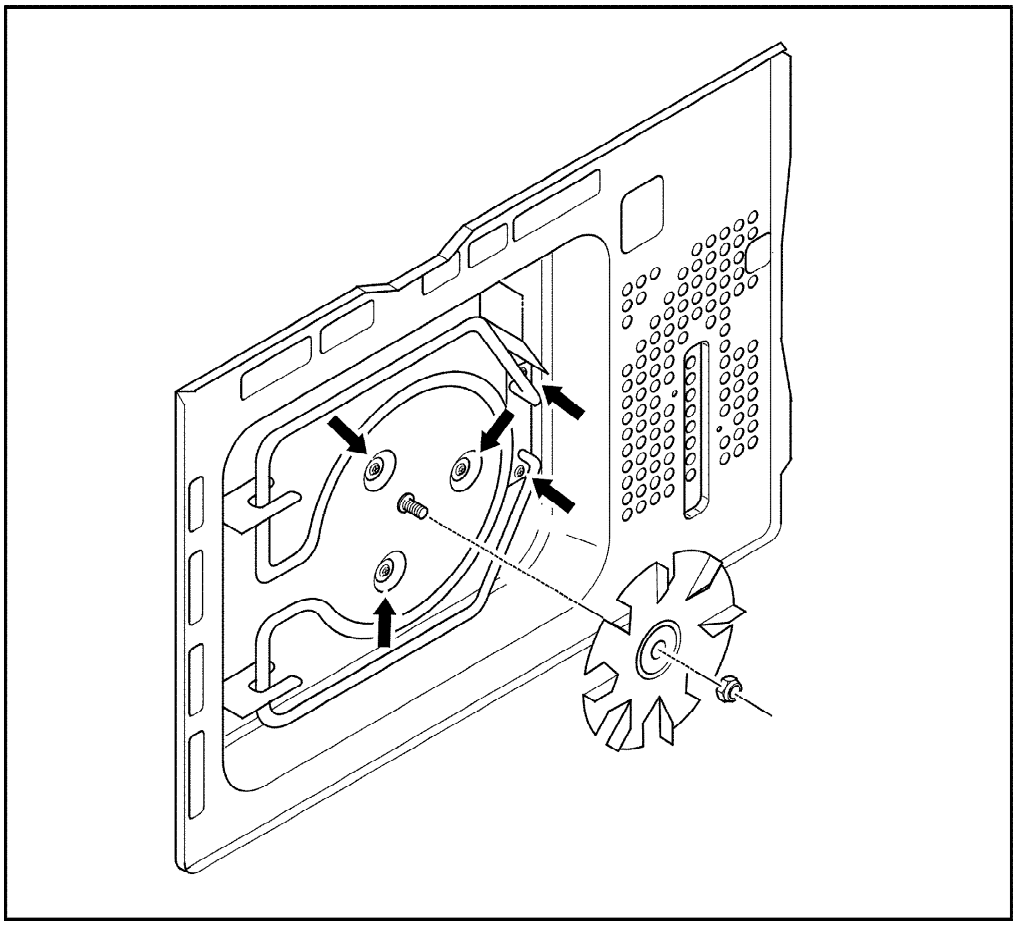
Removing the oven back plate

Figure 15



Removing the base plate

Figure 16



Removing the circulation motor

10. Component Test Procedure

Caution

1. **High voltage is present at the high voltage terminal of the inverter unit, including the aluminium heat sink.**
2. **It is not necessary or advisable to attempt to measure this high voltage.**
3. **Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitors.**

10.1. Primary Latch Switch, Secondary Latch Switch and power relay B interlocks.

1. **Unplug the lead connectors to power relay B and verify the continuity of the power relay B 1-2 terminals.**
2. **Unplug the lead connectors to the primary latch switch and**

secondary latch switch.

3. Test the continuity of the switches with the door open and closed with an ohm meter on the lowest scale.
   Normal continuity readings should be as followed.

	Door Open	Door Closed
Primary Latch Switch	infinite Ω (Open)	0 Ω (Close)
Secondary Latch switch	infinite Ω (Open)	0 Ω (Close)
Power relay B	infinite Ω (Open)	infinite Ω (Close)

10.2. Short Switch and Monitor Circuit

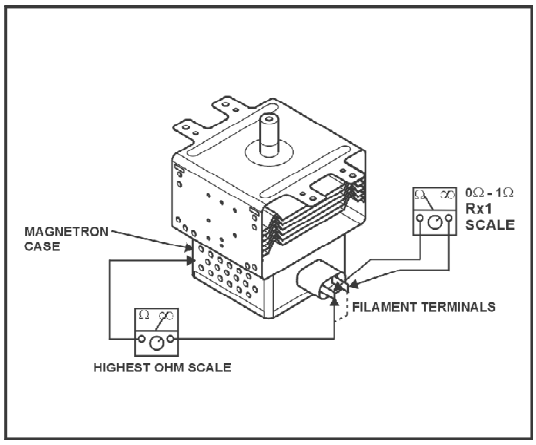
1. Unplug the lead wires from the HV inverter primary terminals.
2. Connect the test probes of the ohm meter to these leads
3. Test the continuity of the short switch with the door open and the door closed using the lowest ohm scale.

	Door Open	Door Closed
Monitor switch	0 Ω	infinte Ω

10.3. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose an open filament or shorted magnetron.

1. Isolate the magnetron from the circuit by disconnecting the HV leads
2. A continuity check across the magnetron filament terminals should indicate one ohm or less
3. A continuity check between each filament terminal and the magnetron case should read open.



10.4. Push Button Keyboard

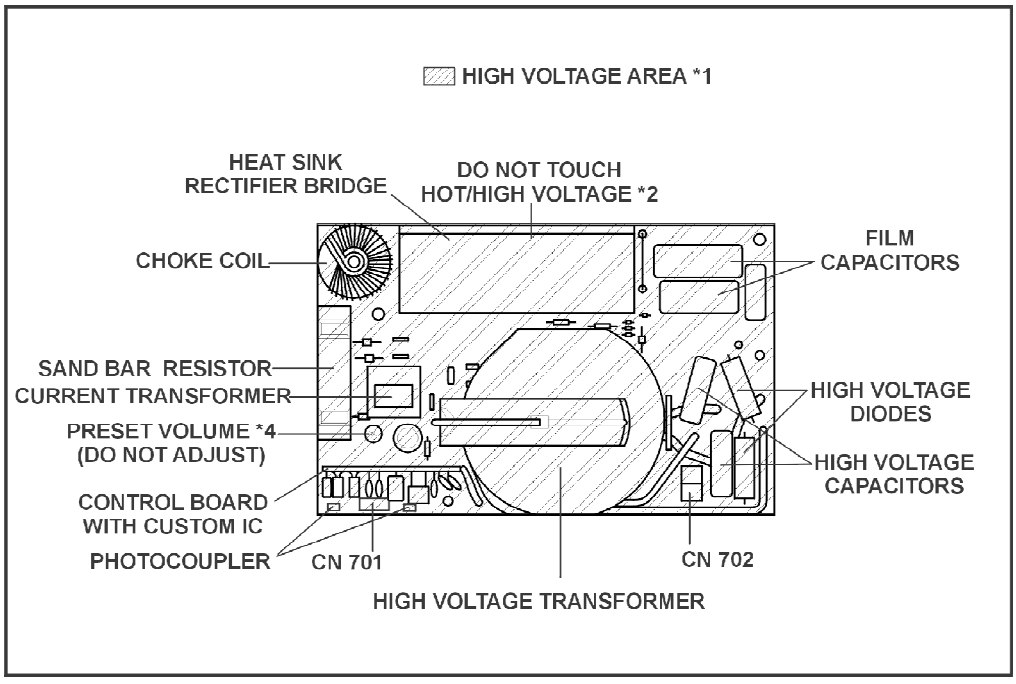
Check the continuity between the switch terminals, by tapping an appropriate pad on the keyboard. The keypad matrix is shown on Key Board Matrix.

10.5. Inverter Power Supply

Caution

DO NOT try to repair this inverter power supply). Replace as a whole H.V. Inverter Unit.

Figure 3



Inveter power supply diagram

10.6. Inverter Power Supply Unit

Warning

Do not attempt to make any measurements in the high voltage circuitry of the inverter or magnetron.

See troubleshooting of the inverter circuit and magnetron on page 27 to determine if the inverter power supply is still functioning.

10.7. Temperature Sensor

A temperature sensor is mounted on the rear of the oven. The resistance reading across the thermistor should read 300K ohm within a temperature range of 10 to 30 degrees centigrade. This would be the temperature range within a kitchen environment. If the resistance measured is outside this range the thermistor is defective and should be replaced.
NOTE: When measuring the resistance of the thermistor disconnect the connector from the digital programmer circuit.
NOTE: If the microwave oven has been operated allow to cool to room temperature before attempting to measure the thermistor resistance.

10.8. Humidity sensor and digital programmer circuit NN-A890WB

1. **Check the resistance across the sensor heater terminals. Normal cold resistance should read approximately 4.5 ohms.**
2. **Check the volatge across the sensor heater terminals. It should read approximately 2.5VDC**
3. **In order to determine if the auto cooking by humidity sensor is working, perform the following test. /**

1. **Place a water load (150cc) in the oven.**
2. **Press the auto reheat panel.**
3. **Press the start pad**
4. **The humidty sensor detects steam about 2 to 4 minutes after the start pad has been pressed.**
5. **The auto cooking (T1) automatically switches to cooking time. (T2)**
6. **The remaining cooking time T2 appears in the display window. If 48s -1min 36 secs appears in the display , the humidty sensor function is normal.**

11. Measurements and Adjustments

Warning

- **For continued protection against radiation hazard, replace only with identical parts.**
- **When the 10 amp fuse is blown due to the operation of the short switch, you must replace the primary latch switch and short switch. Then follow the installation procedures below.**
- **Interlock switch replacement - In replacing faulty switches, be sure**

mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.

- Refer to the schematic and wiring diagram to ensure proper connection

11.1. Installation of primary latch switch, secondary latch switch and short switch.

1. When mounting the primary latch switch, secondary latch switch and short switch to the door hook assembly. Follow the instructions in figure 1.
   NOTE: No specific adjustment during the insulation of each switch into the door hook is necessary.
2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrow in figure 1. Ensuring the door does not have any play in it. Check for play by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.
3. Reconnect the short switch, primary switch and secondary latch switches and check the continuity of the monitor circuit and latch switches by following the component test procedures on page.

11.2. Measurement of microwave output

The output power of the magnetron can be determined by performing the IEC standard test. However, due to the complexity of the IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary equipment:

- 1 liter beaker
- Glass thermometer
- Wrist watch or stop watch

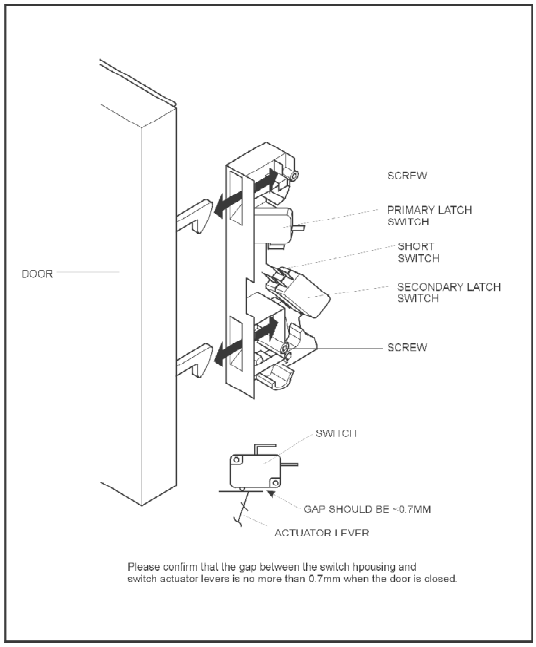
NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beakers temperature (Recorded as T1)
2. Place the beaker on the center of the glass cook plate.
3. Stir the water again and read the temperature of the beaker

(Recorded as T2)

4. The normal temperature rise at the high power position for each model is shown in the table. (Figure 2)

Figure 1


SCREW
PRIMARY LATCH SWITCH
SHORT SWITCH
SECONDARY LATCH SWITCH
SCREW
DOOR
SWITCH
GAP SHOULD BE ~0.7MM
ACTUATOR LEVER
Please confirm that the gap between the switch housing and switch actuator levers is no more than 0.7mm when the door is closed.

Adjustment of latch switch assembly

RATED OUTPUT	TEMPERATURE RISE
1000W	8°C

12. Troubleshooting Guide

Fuses are not blown

Fuses are not blown

Other problems

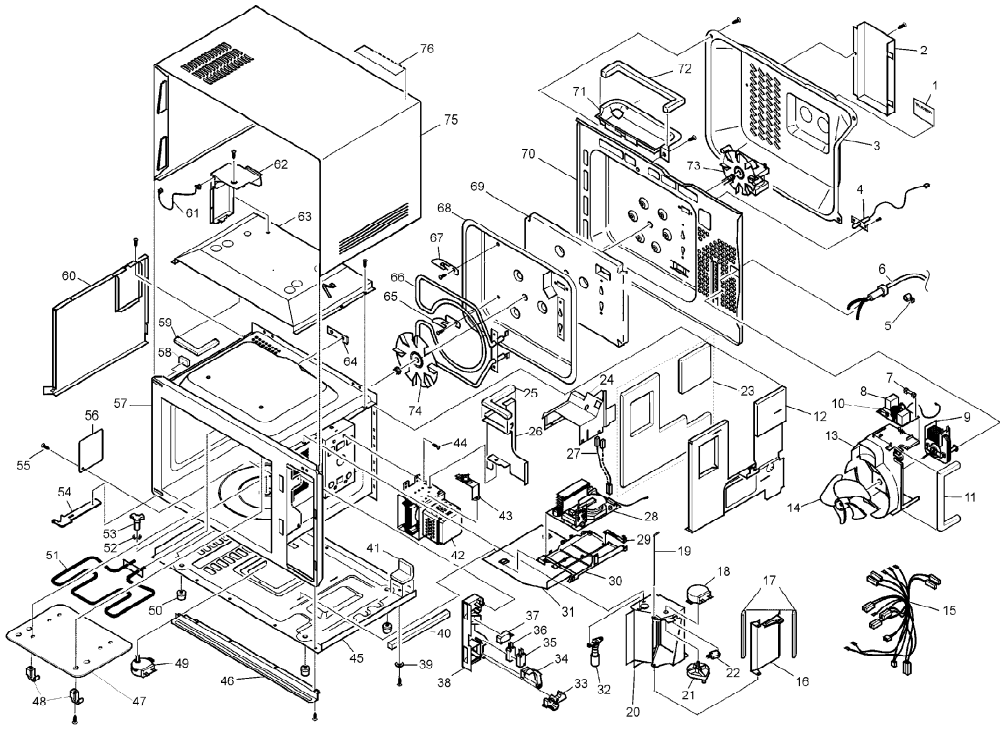
Inverter circuit troubleshooting

Alternative method for toubleshooting the inverter circuit

13. Digital Programmer Troubleshooting Guide

How to check semiconductors

14. Exploded View



15. Main Parts List

1. **Part numbers are indicated on most mechanical parts. Please use these part numbers for part orders. Do not use the description of the part.**

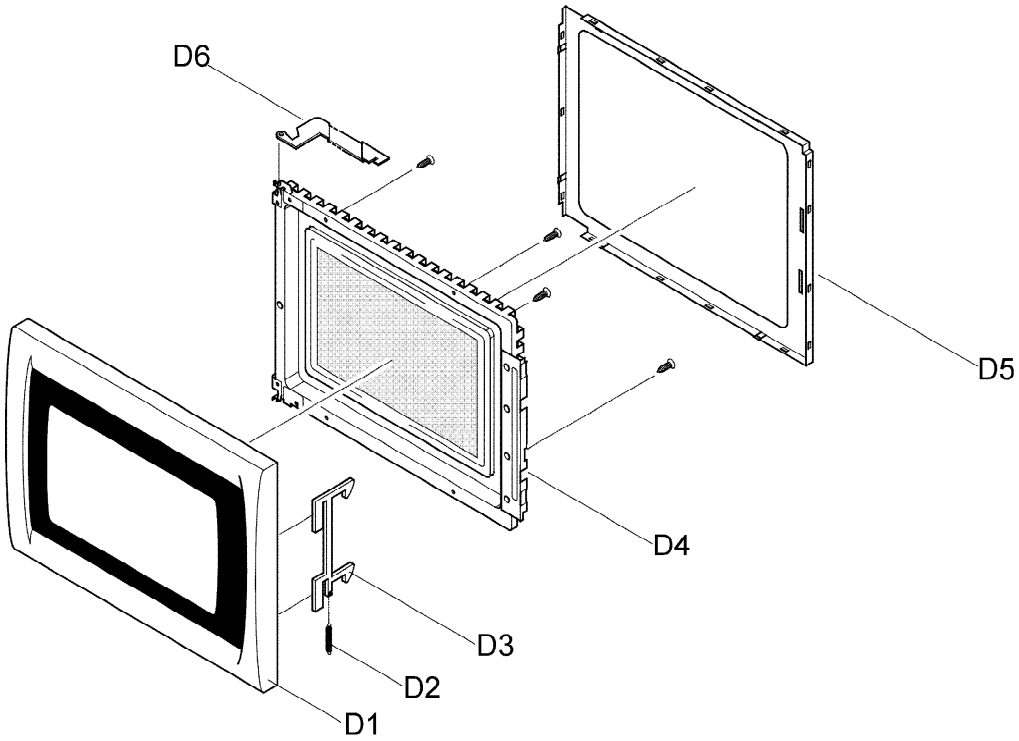
Important safety notice

1. **Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturers specified**

Ref. No.		Part No.	Part Name & Description	Qty	Remarks
1	⚠	E00069000EP	WARNING LABEL	1	
2		E41199000BP	EXHAUST GUIDE D	1	
3		E10589000BP	BACK PANEL COVER	1	
4	⚠	E605A4V20BP	THERMISTER	1	
5		AEE9108A20GN	HOLDER (P CLIP)	1	
6	⚠	E900C4V20GP	POWER CORD SUPPLY	1	
7	⚠	E67597550GP	FUSE 10A	1	
8	⚠	E607X4V20BP	NOISE FILTER	1	
9	⚠	E400A4760JP	FAN MOTOR	1	
10	⚠	AEE6230P10GN	FUSE 16A	1	
11		E09020000AP	CUSHION RUBBER	1	
12		E22369000BP	RIGHT HEATER PANEL	1	
13		E41444V20GP	ORIFICE	1	
14		E40086430GP	FAN	1	
15	⚠	E030A4V20BP	LEAD WIRE	1	
16		E41739000BP	SHUTTER FLAP	1	
17		E09620000AH	CUSHION RUBBER	2	
18	⚠	E63268960JP	MOTOR	1	
19		E41749000BP	SHUTTER PIN	1	
20		E400E9000BP	AIR GUIDE	1	
21		E48236750BP	CAM A	1	
22	⚠	E61425180AP	SHUTTER SWITCH	1	
23		E22439000BP	ADIABATIC MATERIAL A	1	
24		E40474V00BP	AIR GUIDE E	1	
25		E09020000AK	CUSHION RUBBER	1	
26		E40309000GP	AIR GUIDE D	1	
27	⚠	E030E4V20BP	HV LEAD WIRE	1	
28	⚠	E606Y4V20GP	INVERTER	1	
29	⚠	E66014V00BP	INVERTER EARTH BRACKET	1	
30		E65854V00BP	INVERTER SUPPORT BRACKET	1	
31		E01214V20BP	ADAPTOR PLATE	1	
32	⚠	E610T6700BP	OVEN LAMP	1	
33		E31374830AP	HOOK SPACER B	1	
34		E31384830AP	HOOK SPACER C	1	
35	⚠	E61425180AP	SECONDARY LATCH SWITCH	1	
36	⚠	E61785180AP	SHORT SWITCH	1	
37	⚠	AEE6142-1450	PRIMARY SWITCH	1	
38		E30208000BP	DOOR HOOK A	1	
39		E11088020BP	FIBRE WASHER	4	
40		E09020000AL	CUSHION RUBBER	1	
41		E09020000ED	CUSHION RUBBER	1	
42	⚠	2M236-M1G	MAGNETRON	1	
43	⚠	E610U4V20BP	THERMAL CUTOUT ASSY	1	
44		XTWANE4+12B	SCREW	4	
45		E10019000GP	BASE PLATE	1	
46		E16079000BP	DRIP TRAY	1	
47		E21449000BP	SELF CLEAN.PANEL	1	
48		AEE6418Z70BP	HEATER SUPPORT	2	
49		E63268960JP	TURNTABLE MOTOR	1	
50		AEE1008-5S1	RUBBER FOOT	4	
51	⚠	E630G9000GP	GRILL HEATER	1	

Ref. No.		Part No.	Part Name & Description	Qty	Remarks
52		AEE2177-F80	PULLEY SHAFT WASHER	1	
53		E21315870GP	PULLEY SHAFT	1	
54		E30076700AP	HINGE B	1	
55		XSN4+6ZS	SCREW	1	
56		E20559000BP	COVER A	1	
57		E200A4V20BP	OVEN CAVITY	1	
58		E09030000CD	CUSHION RUBBER	1	
59		E22589000BP	ADIABATIC MATERIAL	1	
60		E22379000BP	LEFT HEATER PANEL	1	
61	⚠	E030H9000BP	HUMIDITY SENSOR	1	NN-A890WB
62		E40249000GP	EXHAUST GUIDE A	1	
63		E202N9000BP	UPPER HEATER COVER	1	
64		E64179000BP	HEATER BRACKET A	1	
65		E67579000BP	HEATER BRKT D	1	
66	⚠	E630H9000GP	CONVECTION HEATER	1	
67		E64189000BP	HEATER BRACKET B	1	
68		E607F9000BP	HEATER COVER	1	
69		E22429000BP	ADIABATIC MATERIAL	1	
70		E20339000BP	HEATER COVER B	1	
71		E41079000GP	EXHAUST GUIDE B	1	
72		E09230000AQ	CUSHION RUBBER	1	
73	⚠	E490S8020GP	CONV MOTOR	1	
74		E22399000BP	CIRCUALTION FAN	1	
75		E110D4V30HBP	OUTER PANEL	1	NN-A890WB NN-A860WB
75		E110D4V30BP	OUTER PANEL	1	NN-A860CB
76	⚠	E01505870EP	WARNING LABEL	1	NN-A890WB NN-A860WB

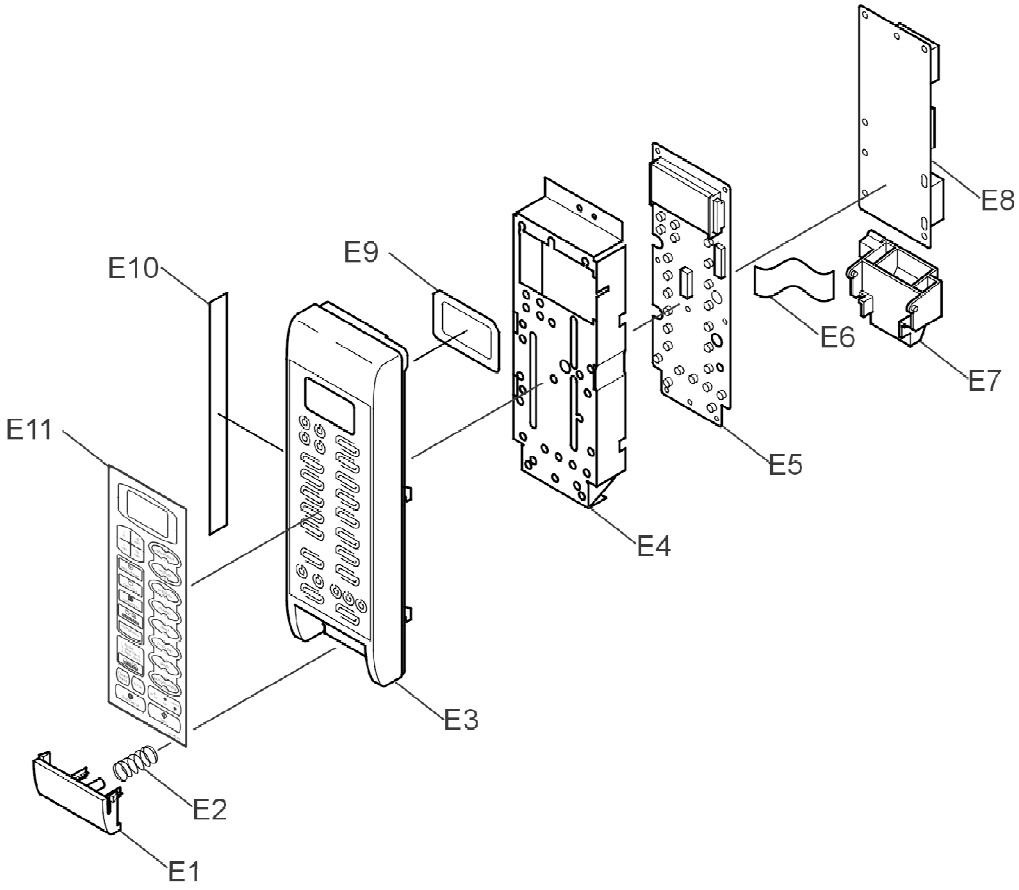
16. Door Assembly



Ref. No.		Part No.	Part Name & Description	Qty	Remarks
D1		E302A4V20HGP	DOOR A ASSYM	1	NN-A890WB NN-A860WB
D1		E302A4V20GP	DOOR A ASSYM	1	NN-A860CB
D2		E30214000AP	DOOR KEY SPRING	1	
D3		E30188000BP	DOOR KEY A	1	
D4	⚠	E302K9000BP	DOOR E	1	
D5		E30859000BP	DOOR C	1	
D6		E30067300AP	HINGE	1	

When ordering any door component also order door C, this part may become damaged during dissassembly of the door.

17. Escutcheon Base Assembly



Ref. No.		Part No.	Part Name & Description	Qty	Remarks
E1		E80724V20HBP	DOOR OPENING BUTTON	1	NN-A890WB NN-A860WB
E1		E80724V20BP	DOOR OPENING BUTTON	1	NN-A860CB
E2		E80378A0AG	SPRING	1	
E3		E80344V20HBP	ESCUTCHEON BASE	1	NN-A890WB NN-A860WB
E3		E80344V20BP	ESCUTCHEON BASE	1	NN-A860CB
E4		E81274V20BP	ESC BACK PLATE	1	
E5	⚠	E603L4V20EP	P C B AU	1	NN-A890WB EPG
E5	⚠	E603L4V20UP	P C B AU	1	NN-A890WB UPG
E5	⚠	E603L4V30EP	P C B AU	1	NN-A860WB EPG
E5	⚠	E603L4V30UP	P C B AU	1	NN-A860WB UPG NN-A860CB UPG
E6		E6629-1600	RIBBON CABLE	1	
E7		E82564V20BP	DOOR OPENING LEVER	1	
E8	⚠	E603Y4V20BP	P C B DU	1	NN-A890WB
E8	⚠	E603Y4V30BP	P C B DU	1	NN-A860WB NN-A860CB
E9		E83264V20BP	DISPLAY SHEET	1	
E10		E00074V30GP	NAME PLATE	1	
E11		E83374V20HEP	ESCUTCHEON SHEET	1	NN-A890WB EPG NN-A890WB UPG
E11		E83374V30HEP	ESCUTCHEON SHEET	1	NN-A860WB EPG NN-A860WB UPG
E11		E83374V30UP	ESCUTCHEON SHEET	1	NN-A860CB UPG

When ordering the escutchoen base also order the name plate

18. Packing And Accessories

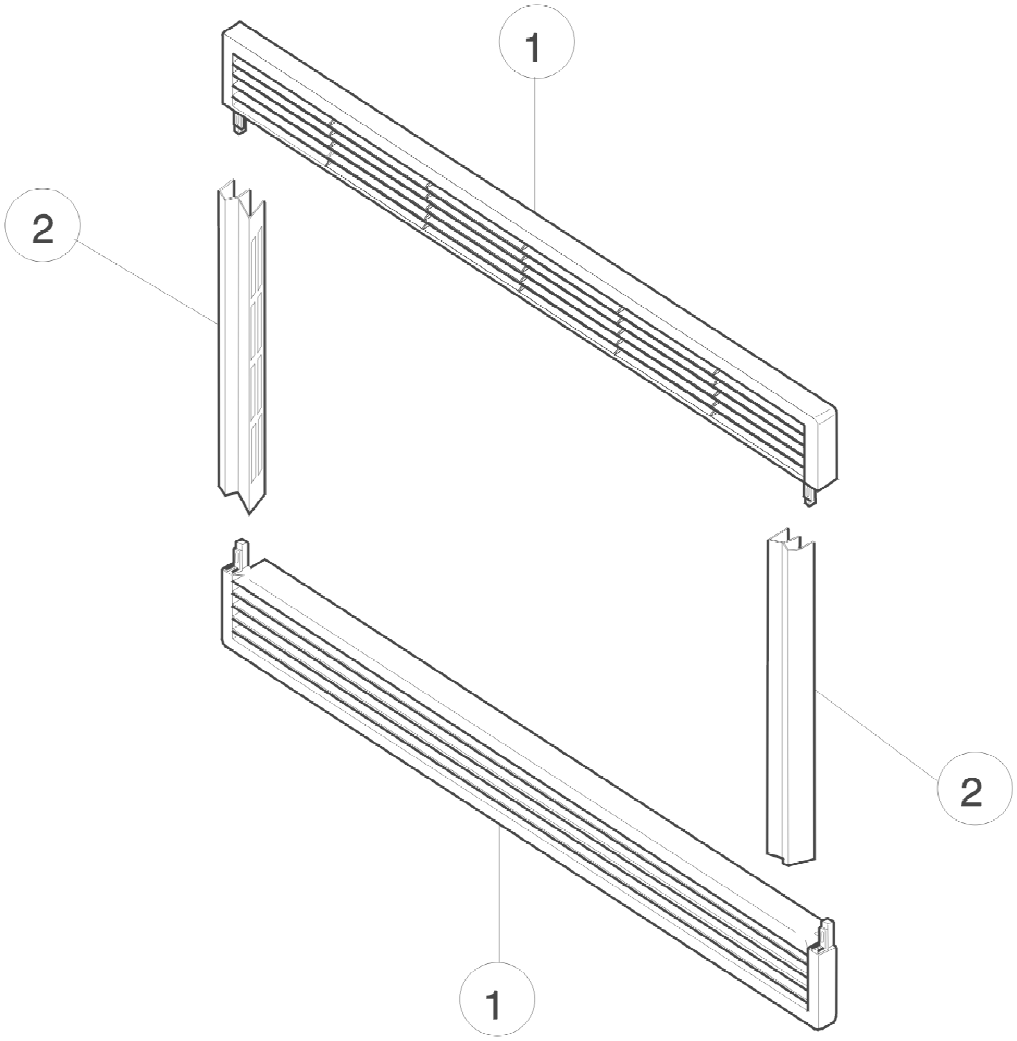
Ref. No.		Part No.	Part Name & Description	Qty	Remarks
P1		E06435870SP	RUBBER FOOT (RED)	3	
P2		E060V5870SP	WIRE RACK LOW	1	
P3	⚠	E06014N30BP	GLASS TRAY	1	
P4		E290D5850GP	ROLLER RING	1	
P5		E01695750BP	SERVICE LIST	1	
P6		E00034V20UP	OPERATING INSTRUCTIONS/ COOKBOOK	1	NN-A890WB UPG NN-A860CB UPG NN-A860WB UPG
P6		E000B4V20BP	COOKBOOK	1	NN-A890WB EPG NN-A860WB EPG
P7		E00034V20EP	OPERATING INSTRUCTIONS	1	NN-A890WB EPG NN-A860WB EPG
P8		E0212-1520	FOAM SHEET	1	
P9		E06015020GP	ENAMEL TRAY	1	
P10		E060W9040ET	CRISPY PAN	1	
P11		E10859040BP	CRISPY PAN HANDLE	1	
P12		E01134N80EP	TRAY STYROL	1	
P13		E060V9000UP	WIRE RACK SQUARE	1	
P14		E06435870SP	RUBBER FOOT (BLACK)	4	
P15		E01084V20EP	TRAY PACKING	1	
P16		E01024V20HEP	CARTON BOX	1	NN-A890WB EPG
P16		E01024V20HUP	CARTON BOX	1	NN-A890WB UPG
P16		E01024V30HEP	CARTON BOX	1	NN-A860WB EPG
P16		E01024V30HUP	CARTON BOX	1	NN-A860WB UPG
P16		E01024V30UP	CARTON BOX	1	NN-A860CB UPG
P17		E01059000BP	LOWER FILLER	1	
P18		E01069000BP	COVER POLYTHENE	1	
P19		E01079000BP	DOOR SHEET	1	
P20		E01049000BP	UPPER FILLER	1	

Ref. No.		Part No.	Part Name & Description	Qty	Remarks
P21		E01926430GP	PROTECTOR SHEET	1	NN-A860CB UPG

19. REF No 8 E607X4V20BP Noise Filter (U)

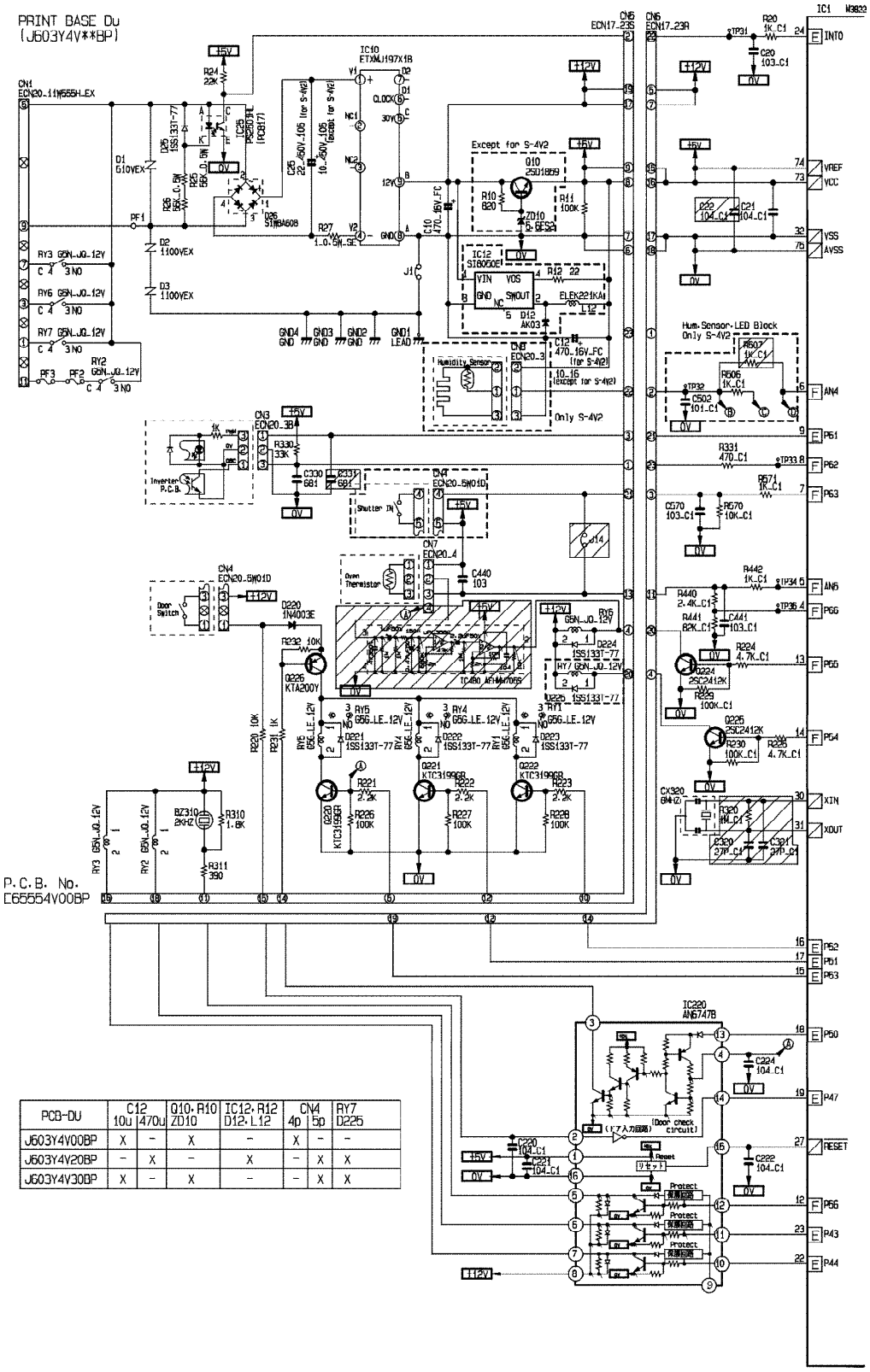
Ref. No.	Part No.	Part Name & Description	Qty	Remarks
R1	ERG1SJ753P	Resistor	1	75K Ω W
C1 & C2	QETJ5225KRP2CE	Capacitor	2	2.2 μ F
C3 & C4	ECKMNA472ME	Capacitor	2	4700pF 250V AC
L1	SC-08-E203A	Inductor	1	2.4mH
F1	E62316010BP	Fuse Holder	2	

20. Parts List For Microwave Oven Trim Kits

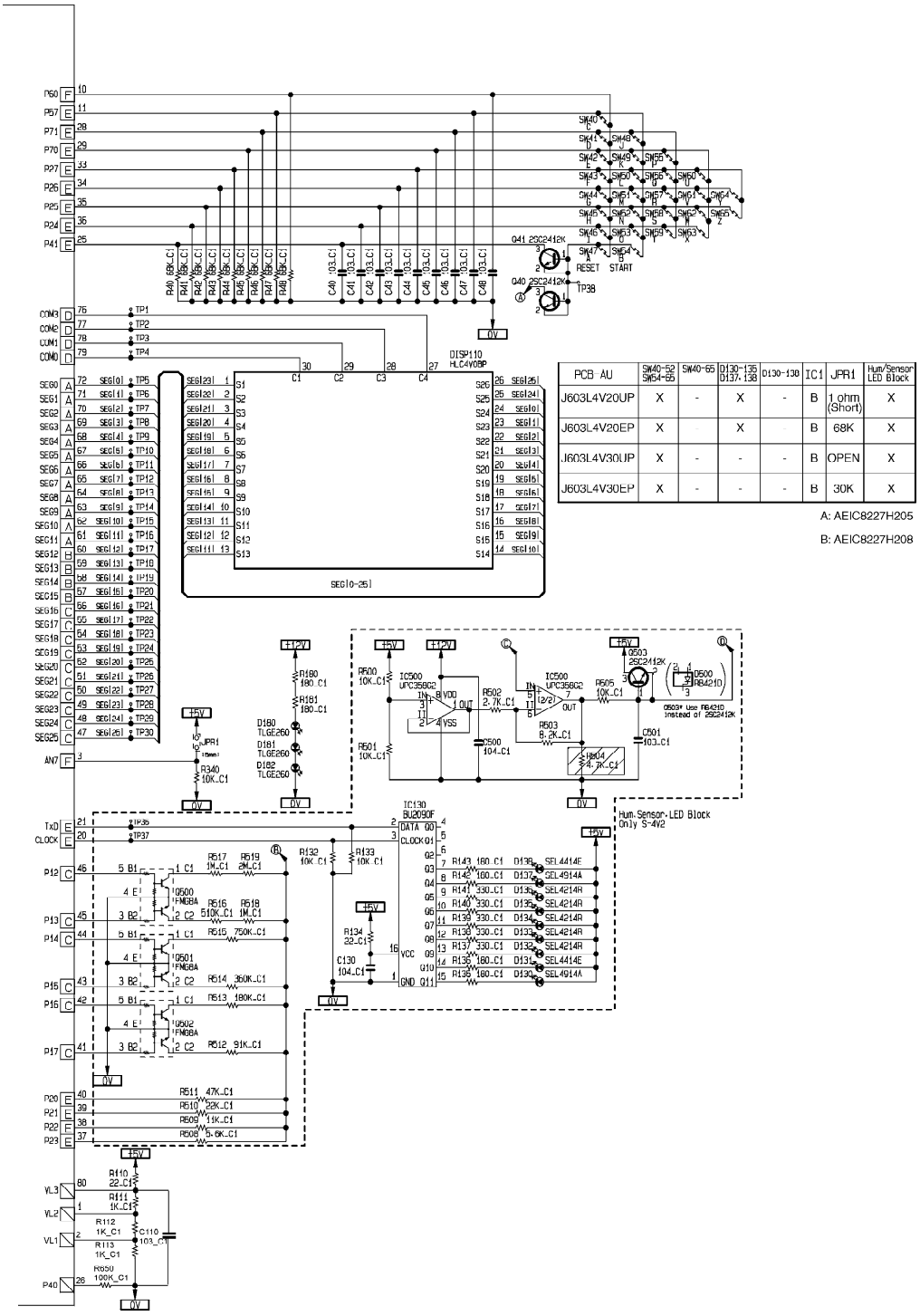


Trim Model Number	Top And Bottom Strip REF No 1	Set	Side strip REF No 2	Set	Microwave Oven Model Number
NN-TKA80W	E1603A510HBP	1	E1601A540HBP	1	NN-A890WB NN-A860WB
NN-TKA80C	E1603A510BP	1	E1601A540BP	1	NN-A860CB
Instalation Guide			A0003A810BP		

21. Digital Programmer Circuit Schematic



PCB-DU	C12 10u	C12 470u	Q10・R10 ZD10	IC12・R12 D12・L12	CN4 4p	CN4 5p	RY7 D225
J603Y4V00BP	X	–	X	–	X	–	–
J603Y4V20BP	–	X	–	X	–	X	X
J603Y4V30BP	X	–	X	–	–	X	X



PCB AU	SW40~52 SW54~65	SW40~65	D130~135 D137, 138	D130~138	IC1	JPR1	Hum/Sensor LED Block
J603L4V20UP	X	-	X	-	B	1 ohm (Short)	X
J603L4V20EP	X	-	X	-	B	68K	X
J603L4V30UP	X	-	-	-	B	OPEN	X
J603L4V30EP	X	-	-	-	B	30K	X

A: AEIC8227H205

B: AEIC8227H208

22. Key Board Matrix

23. Digital Programmer Circuit Parts

23.1. E603L4V2UP/EP E603L4V3UP/EP DPCAU

Ref. No.		Part No.	Part Name & Description	J603L 4V2UP	J603L 4V2EP	J60
C502		AECU1F101J50	100pF Chip Capacitor	1	1	0
C40-C48 C110 C20 C441 C570		AECU1F103Z50	10nF Chip Capacitor	13	13	13
C501		AECU1F103Z50	10nF Chip Capacitor	1	1	0
C220 C221 C222 C224 C21		AECU1F104Z25	100nF Chip Capacitor	5	5	5
C130 C500		AECU1F104Z25	100nF Chip Capacitor	2	2	0
R111-R113 R20 R442 R571		AERJ3GSYJ102	1K Chip Resistor	6	6	6
R506		AERJ3GSYJ102	1K Chip Resistor	1	1	0
R132 R133 R570		AERJ3GSYJ103	10K Chip Resistor	3	3	3
R500 R501 R505		AERJ3GSYJ103	10K Chip Resistor	3	3	0
R650 R229 R230		AERJ3GSYJ104	100K Chip Resistor	3	3	3
R517 R518		AERJ3GSYJ105	1M Chip Resistor	2	2	0
R340		AERJ3GSYJ103	10K Chip Resistor	1	1	1
R509		AERJ3GSYJ113	11K Chip Resistor	1	1	0
R180 R181		AERJ3GSYJ181	180 Chip Resistor	2	2	2
R135 R136 R142 R143		AERJ3GSYJ181	180 Chip Resistor	4	4	0
R513		AERJ3GSYJ184	180K Chip Resistor	1	1	0
R519		AERJ3GSYJ205	2M Chip Resistor	1	1	0
R110		AERJ3GSYJ220	22 Chip Resistor	1	1	1
R134		AERJ3GSYJ220	22 Chip Resistor	1	1	0
R510		AERJ3GSYJ223	22K Chip Resistor	1	1	0
R440		AERJ3EKF2401	2.40K Chip Resistor 1%	1	1	1
R502		AERJ3GSYJ272	2.7K Chip Resistor	1	1	0
R137-R141		AERJ3GSYJ331	330 Chip Resistor	5	5	0
R514		AERJ3GSYJ364	360K Chip Resistor	1	1	0
R331		AERJ3GSYJ471	470 Chip Resistor	1	1	1
R224 R225		AERJ3GSYJ472	4.7K Chip Resistor	2	2	2
R511		AERJ3GSYJ473	47K Chip Resistor	1	1	0
R516		AERJ3GSYJ514	510K Chip Resistor	1	1	0
R508		AERJ3GSYJ562	5.6K Chip Resistor	1	1	0
R40-R48		AERJ3GSYJ683	68K Chip Resistor	9	9	9
R515		AERJ3GSYJ754	750K Chip Resistor	1	1	0
R503		AERJ3GSYJ822	8.2K Chip Resistor	1	1	0
R441		AERJ3EKF8202	82.0K Chip Resistor 1%	1	1	1
R512		AERJ3GSYJ913	91K Chip Resistor	1	1	0
J18 J19 J5 J31		ERJ8GEY0R00V	Chip Jumper (3216)	4	4	4
Q503		AESSRB421D	Shottky diode	1	1	0
Q40 Q41 Q224 Q225		2SC2412KT146	NPN Transistor	4	4	4
Q500-Q502		AESCFMG8AE	Dual NPN Digi-Tr	3	3	0
IC500		AEICUPC358G2	OP-AMP	1	1	0
IC130		AEICBU2090F	IC (Serial-Parallel)	1	1	0
IC1	⚠	AEIC8227H208	LSI M3822 (32K)	1	1	1
CX320		EFOMC8004T4	Ceramic Resonator	1	1	1
SW40-52 SW54-65		EVQ11L05R	Push Switch	25	25	25
D132-D135		AELN4214R	RED LED (Diffused)	4	4	0
D131 D138		AESQSEL4414E	GREEN LED (Clear)	2	2	0
D130 D137		AESQSEL4914A	ORANGE LED (Clear)	2	2	0
D180-D182		AESQTLGE260T	Green LED (backlight)	3	3	3
DISP110		AEDDHL4V00BP	LCD	1	1	1
		A611A4J01XN	Display Holder Unit	1	1	1
IC220		AN6747B	Custom IC	1	1	1
		E62604V20BP	Print Board (A) with Carbon	1	1	1
CN6		AEEM23FESVKN	CONNECTOR	1	1	1

Ref. No.		Part No.	Part Name & Description	J603L 4V2UP	J603L 4V2EP	J60
JPR1		ERDS2TJ1R0T	1 ohm Carbon Resistor	1	0	0
JPR1		ERDS2TJ683T	68K Carbon Resistor	1	1	0
JPR1		ERDS2TJ303T	30K Carbon Resistor	0	0	0

23.2. E603Y4V20BP E603Y4V30BP DPC DU

Ref. No.	Part No.	Part Name & Description	J603Y 4V20BP	J603Y 4V30BP
ZD10	AESZMTZ5R6B	Zener Diode	0	1
D221-D225	AESS133T-77	Silicon Diode	5	5
D25	AESS133T-77	Silicon Diode	1	1
D220	AESS1N4003E	Silicon Diode	1	1
D12	AESSAK03	Shottky Diode	1	0
C330	ECBT1H681KB5	680PF Capacitor	1	1
C440	ECBT1E103ZF5	10nF Capacitor	1	1
R25 R26	ERDS1FJ563T	56K 1/2 Watt Resistor	2	2
R220 R232	ERDS2TJ103T	10K Resistor	2	2
R11 R226-R228	ERDS2TJ104T	100K Resistor	4	4
R12	ERDS2TJ220T	22 Resistor	1	0
R231	ERDS2TJ102T	1.0K Resistor	1	1
R221-R223	ERDS2TJ222T	2.2K Resistor	3	3
R24	ERDS2TJ223T	22K Resistor	1	1
R330	ERDS2TJ333T	33K Carbon Resistor	1	1
R311	ERDS2TJ391T	390 Resistor	1	1
R10	ERDS2TJ821T	820 Resistor	0	1
R310	ERSD2TJ182T	1.8K Resistor	1	1
Q10	2SD1859TV2	Transistor	0	1
Q226	AESAKTA200Y	PNP Transistor	1	1
Q220-Q222	AESCKTC3199GR	NPN Transistor	3	3
C10	EEUFC1C471B	470uF 16 V Elect Capa	1	1
C12	EEUFC1C471B	470uF 16 V Elect Capa	1	0
C12	ECEA1CKA100B	10uF 16V Electrolytic Capacitor	0	1
R27	ERX12SJ1R0E	1R 1/2 Watt Resistor	1	1
L12	ELEKN221KA	220uH	1	0
CN3	AEEMXF00703B	3 Pin Connector (Inverter)	1	1
CN8	AEEMMF00703W	3 Pin Connector (Figaro Sensor)	1	0
CN7	AEEMMF00703R	3 Pin Connector (OvenThermistor)	1	1
CN4	AEEMXF01D05W	5 Pin Connector	1	1
C25	A6219-1850	Capacitor Cover (small)	0	1
C26	A62194J00XN	Capacitor Cover (large)	1	0
RY2 RY3 RY6 RY7	AEBGG5N1A12	12 V Relay	4	4
RY1 RY4 RY5	AEGG5G1A12	12 V Relay	3	3
CN5	AEEM23FEBVKN	23 Pin Connector	1	1
CN1	AEEMXD55511W	11 Pin Connector	1	1
IC25	AEICP25011HL	Photocoupler IC	1	1
D26	AESTS1WBA60B	Diode Bridge (600V)	1	1
IC12	AEICSI8050E	IC (DC-DC conveter)	1	0
C25	ECA2WHG100E	10uF 450V Electrolytic Capacitor	0	1
C25	ECA2WHG220E	22uF 450V Electrolytic Capacitor	1	0
BZ310	EFBAH20C001	2KHz Buzzer	1	1
D2 D3	ERZV10D112C1	Varistor 1100V	2	2
D1	ERZV10D511CS	Varistor 510V	1	1

Ref. No.	Part No.	Part Name & Description	J603Y 4V20BP	J603Y 4V30BP
IC10	ETXMJ197X1BG	Switching Power Supply	1	1

S-4V20 / / / / S-4V30 / SM